The Tooth Drawer.

F. P. Halbert.

Johnstons'

Dental Miscellany,

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PERSONAL INDEX.

As it is often important to each participant in public proceedings to recall what he did or said, we think that an index of the names mentioned in our pages during the past year will be a convenience to many. Where a name occurs more than once in the same article, only the page of its first occurrence is designated. Capitals are used with the names of authors whose writings have appeared in our pages for 1874.—Ed.

J. E. ...

JOHNSTONS'

Dental Miscellany.

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HYPERÆSTHESIA.

Read before the New York State Dental Society, by W. S. Elliott, D.D.S., Goshen, N. Y.

The term Hyperæsthesia is compounded from the Greek, and signifies *exalted sensation.*

It is to be assumed that even the first step in consideration of this subject must necessarily take issue with the circumstances of a healthy and normal condition of the several parts to which reference may be made, for the evident reason that the sensation of pain is evolved through a disturbance of the natural functions, by a power foreign to that which is concomitant, and which impels the parts to perform the duty assigned to them in the human economy.

This position it is not necessary to argue, for the facts obtrude themselves upon the attention and to the conviction of every one who is not void of the sense of touch.

Hyperæsthesia presupposes the existence of the function of common sensation, and, moreover, such a qualified condition of the parts as would tend to an exalted degree of expression through a given amount of foreign force or disturbance.

Nature has provided for the continued well-being and preservation of the functions and structure of the body, by implanting in the living tissue a sentient principle which becomes the protector or guardian of such tissue, and the agent of nerve communication between the several parts and the sensorium.

This sentient principle, *feeling*, becomes positive in its nature through the fact of its primary association with animal structure.

As, in accordance with the law of physics, a negative may be im-

plied, so may we recognize its opposing condition—absence of feeling, or, *anæsthesia.*

It will be in accordance with our purpose to make reference to the adaptability of this primal sense to the performance of its part in the general economy; to study the rationale of the excessive perversion or exalted sensibility, and to consider the general means to be adopted for its reduction.

This inherent conservative power before referred to is normally exercised by the circumstances of our being, and becomes a source of constant gratification and pleasure. In the reception of food, for instance, an impression is made upon the organs of taste and deglutition, and a sensation is eliminated which is pleasurable, and is in accordance with original design. If the food taken is in excess, or, if it is of an improper kind, the natural functions of the organs are in consequence perverted; sensation is thereby unduly exalted, and is transformed into pain. This pain becomes in its turn a further disturbing cause, and its influence is variously extended throughout the system. The parts are thus rendered abnormal, and no longer possess the power to transmit that agreeable sensation which was their office while in a healthful state. A sincere and hearty grasp of a friendly hand sends its thrill of joy to the brain, and none of this pleasurable sensation is compromised by its mechanical firmness. Every wave of moving air, and every sunbeam, lend their aid to the elimination of this sense of touch, and in a thousand ways do we recognize the admirable adaptability of this sense to our comfort and welfare. Light in its multiform reflections, and odors in their several degrees of intensity—all give vibration to the sensory nerves, wonderful in the minutiæ of their action, and a phenomenon which may thwart the reasoning of the most profound philosopher.

The very association of these organs of sense with the system proves that sensation is a necessity of our being, and, moreover, the existence of the nerves of transmission prove the pre-established purposes which are accomplished through this media.

It is further evinced that common sensation is the excitor to a still higher grade of function eliminated from and exalted above that of the physical. It is manifested in our thinking and our willing.

The continued maintenance of the organic structure is thereby to a still greater degree provided for, as the mind plans for this end and exercises its controlling influence over defined tendencies and habits.

Sensation being, then, received as an elementary principle of our being,

it may prove interesting to inquire into the nature of the function, and its association with the seat of consciousness. We shall not assume, however, that it is within our power to decide the theory of nerve transmission, or the why and wherefore of this phenomenon, any more than it shall become our province to decide relative to the rationale of universal vital action as exemplified throughout nature—in the growth of a blade of grass, the elimination of a ray of light, or other results of instituted force; but we may presume to broach a theory, upon the basis of which we will account for the disparity in the degrees of sensation under apparently similar circumstances.

A concomitant of force is motion. Sensation is made evident to the consciousness through an undulatory or vibratory motion of the nerve tract, by a force which may be inherent or foreign. This excitant, if restrained in its influence, to a limited degree ministers to our pleasure and becomes subservient to our comfort; but the moment the bounds are overreached, then exalted sensibility, or pain, ensues as an evident result of an increased or perverted undulatory nerve motion which is extended to the ganglionic centers. Somewhat analogous to this manifestation, we may instance the vibratory action of a rigidly extended musical chord, which, when set in motion, gives out sounds varying in power or quality corresponding to the degree of tension and other circumstances therewith connected. The auditory nerve, sympathizing, takes upon itself direct vibratory action, and a sensation agreeable or otherwise is thereby manifested. The sensory nerves of touch receive, then, the undulatory or vibratory action through various excitants at their peripheral extremities, and as, according to the nature of these excitants, and the condition of the nerve chord, so is the impression realized. This, as we have before averred, may be a sense of pleasure or pain. An unnatural or undue excitation produces a confused and irregular or discordant motion of the nerve trunk, resulting, as necessarily it must, in a discordant impression.

The pain felt by the piercing of the flesh with a fine sharp instrument produces a rapid and short undulatory action of the afferent nerve, which is instantly responded to from the brain; the discomfort being of a kind which is almost unbearable. The sting of an insect, an organ more delicate than the finest instrument, produces still shorter and quicker vibrations, and the pain resulting is still more acute, corresponding in a marked degree to the shrill and piercing tone that becomes so unpleasant and painful to the ear. But the same amount of pain may become more endurable when caused by an excitant that

produces more obtuse and longer continued undulatory or wave action. Pain under such circumstances is subdivided, as it were, and each undulation is experienced at different moments of time. In this we recognize the common law of mechanical philosophy, where resistance is overcome by the mechanical powers, through a subdivision of the resisting mass, and transformation of direct force into a force of extended time and motion. Irritation, in whatsoever form it may exhibit itself—mechanical, chemical, or emotional—is productive of pain in proportion to the facility of the nerves to take on undulatory action. In a normal condition of health they assume a state of passive quietude, and as in physics any body at rest requires, to set it in motion, an expenditure of force greater than that which would continue it in motion, therefore, an amount of irritation which would, under other circumstances, give undue motion to the nerves, is, to this extent, resisted. On the other hand, when the nervous system has been acted upon, and thereby made tremulous, through a departure from hygienic laws or otherwise, the special force required to institute the undulations being already expended, the nerves readily take on the increased action, through the same amount of irritation which in the former case was unproductive of painful results.

We recall instances of that hereditary tendency exhibited in the nervous temperament, wherein the nerves are almost constantly agitated in response to external influences or mental emotions. The slightest additional force produces that exalted degree of sensation, the perception of which is true hyperæsthesia.

But notwithstanding such an error of function, the effect is oftentimes measurably counteracted by an effort of the will to resistance, and while we would hold that the impression made is a physical one, the close relationship of the mind to the material organism is such that the exhibition of any disturbance may be, through its agency, sensibly modified.

This leads us naturally to a consideration of the means to be adopted to subdue this excessive disquietude. That the mind, in its capabilities, rises eminently above its material surroundings, and is possessed of "a self-determining power," one will not presume to question. This determination of the mind to do or forbear an action constitutes the will, and when habitually exercised, it has, to a greater or less extent, a controlling power over many of the functions and sensations of the body, and when these functions are manifested through the exercise of the nervous system, the will, in proportion to the degree of its development, becomes a means whereby the function is maintained or sensation modified.

In whatever instance of irritation, as presented in practice, common intuition would lead us first to remove such irritant, so far as disorganized structure, if such there be, will admit of; to substitute such palliatives as the circumstances would suggest, and to build up and strengthen the general system by medical or hygienic treatment.

To follow out these general principles, and to make application in special cases, becomes the duty of the practitioner.

To the dentist, the cases are numerous which will be considered in conformity with the views that we have endeavored to advance in this paper. We will instance :

Miss A., aged twenty, of highly nervous temperament, and in a state of great trepidation and anxiety, with a faltering and unwilling step, applies for the treatment of dental caries. The nervous system is tremulous, and fear of possible excruciating torture is depicted on her countenance. During this systemic excitement an examination is reluctantly submitted to, and it is proven that the dentinal tissue is, to an exalted degree, susceptible to the slightest impression of an instrument or applied medicaments. Why? the dental nerve, in sympathy with the nerves of the entire system, has already taken upon itself the long wave action; the motion being already instituted, the slightest irritation now urges it to increased rapidity and consequent exaltation of sensation.

What may be the treatment in this case? It is simple, and should commence at the moment the patient enters the office—for a quick eye will detect the evidences of suffering at once. We would recommend cordiality, a free, open-heartedness of reception, gentlemanly manners, no haste to institute a diagnosis, pleasant conversation, an invitation to entire confidence, and an assurance that your utmost skill and care will be exercised in the treatment. The results are oft-times pre-eminently successful. The nervous system is quieted, tension relieved, and the will stimulated to that resistance which will measurably subdue pain.

Certain climatic changes will oft-times predispose the patient to this peculiarly heightened irritability, and under such circumstances the disease will become in a great measure epidemic. The following case will illustrate:

Mrs. B. applied for the treatment of neuralgia. The day was an unpleasant one, the wind north-east and chilly; rheumatic affections were prevalent and the victims more or less morose and uncongenial. Mrs. B. was agitated and nervous, but the case was stated and treatment desired; it proved, however, utterly impossible to prosecute an examination. When it was suggested that quiet submission was neces-

sary, the lady burst into a flood of tears, and nothing was accomplished.

A day or two passed by, the weather became pleasant, she returned and submitted quietly to treatment.

It may not be possible in all cases to discover the cause which predisposes to this state of hyper-sensitiveness, but it is evident that there is established a degree of tension frequently too great for the will power to overcome: and if the courage has at last been worked up to the "sticking-point," reaction often follows sufficient to prostrate the patient for several days upon the sick bed, rendering the period one of great distress and discouragement.

DREAD OF THE DENTIST.

A Paper read before the New York Odontological Society, Nov. 17, 1874, by ALBERT H. BROCKWAY, M.D.S.

Mr. President: We have the authority of the wise "Autocrat of the Breakfast Table," that it is not in good taste to begin a letter with an apology; and perhaps the same rule would apply to other communications; nevertheless, I will venture to preface what I am about to say on this occasion by the remark, that only the modest form of the request of the Executive Committee for a paper, "however brief," could have induced me to promise compliance on so short notice as was given. I can assure you, therefore, that what I have here hastily set down, will at least not bore you by its length.

Recognizing the fact, which the experience of every one of our profession will confirm, that there exists in the minds of all who are so unfortunate as to require our services, an almost inexpressible *dread* of undergoing operations at our hands—a feeling which may safely be held accountable for very much of the ravages of disease and decay that we are called upon to repair—it may, perhaps, be profitable for us to inquire into the causes which have produced this prevailing sentiment, so evidently founded on experience widespread and general.

That we, as a profession, are responsible for much of it, is perhaps not flattering to our feelings or our vanity; nevertheless I am inclined to think that it is measurably true. We have needlessly tortured the nerves, and taxed the time and endurance of our patients; and it is not strange that this fear of the dentist has become so prevalent and constant.

Do not understand me as charging thus strongly upon every practi-

tioner; some are, of course, far more blameable than others, but all must suffer from the evil practices of a part.

Nor do I assert that the needless suffering which I charge is inflicted maliciously—far from it; I believe that, as a body, our profession is made up of men of more than average benevolence and kindness of heart, inasmuch as their sympathies are cultivated and enlarged by constant exercise: but it should be borne in mind that

> "Evil is wrought by want of thought
> As well as want of heart,"

and that if we neglect to do whatever we may to *mitigate* the severity or tediousness of our operations, we are justly culpable.

Let me, then, briefly point out some of the methods whereby evil is wrought, and reproach brought upon us.

And first I would speak of the rough and careless manner in which some operators perform their manipulations, seizing the mouth with needless force, drawing the cheeks out in so rude a manner, as not unfrequently to abrade or even lacerate the corners of the mouth and lips. To such rough operators, might well be commended Hamlet's advice to the players, to "use all gently."

A second cause of needless suffering is the use of dull or improper instruments, especially in preparing cavities for filling. A mistaken idea of economy induces some to work on year after year with worn and stubbed excavators, incapable of being brought to the proper delicate and keen edge, and consequently requiring for their employment the exercise of unnecessary force, besides greatly prolonging the operation; or, if the burring engine is brought into requisition for the purpose, the burrs are worn and dulled, generating in their use so much heat as to cause excruciating pain, and possibly endangering the health of the pulp.

A third source of needless discomfort is the neglect to employ means to lessen the sensibility of the dentine; and at the risk of seeming egotistical, I will here take occasion to say that I have, in my own practice, found *no* means so effectual and convenient for this purpose, as that of keeping the cavity *dry* during the excavating—a plan which I suggested in a paper read before the Brooklyn Dental Society, some time ago.

But I will not further extend this branch of the indictment, although it might easily be done; but will proceed to speak of the way in which we needlessly tax the *endurance* of our patients, aside from the giving of acute pain. And this we mainly do through lack of system and order

in our way of operating, and keeping of our instruments: through lack of needful preparation of the many little appliances which we constantly have occasion to use, and still more largely, through faulty methods of practice. In all this we waste time, and thus not only wrong our patient, but abridge our own usefulness. I am not an advocate of hasty operations, but I truly believe that among the better class of dental practitioners—those who truly seek the good of their patients—on an average, *twice* the necessary time is consumed in their operations through the causes indicated.

I speak of a lack of system and order. How many of us have "a place for everything and everything in its place"? Who has not seen (in the cabinet of his neighbor) excavators, burrs and pluggers jumbled indiscriminately together in one drawer; or, if separate drawers were indeed assigned to each kind, has not seen dozens of these piled one upon another, necessitating a vexatious pawing over of the whole whenever another instrument is wanted.

I speak of a lack of preparation of needful and often used articles. How many of us have ready at hand, pellets of punk or paper for drying out; ligatures for holding the rubber dam; nerve broaches ready wound for swabbing out root canals; and various things of that sort, all of which may properly be prepared and in readiness before the coming of our patient.

I have reverted to *faulty methods*, and herein I consider lies the most weighty count in the indictment with which I set out. It is a phase of the subject upon which a whole paper might be written. I shall, however, touch upon it but briefly, and that mainly at one point—the necessity of employing an assistant. If any method of practice may be considered faulty in these days, it may, I think, be that which dispenses with an assistant at the chair. The recent improvements which have been put into our hands—notably the burring engine and the rubber dam—are shorn of half their value if we attempt to use them alone; and yet we see on every hand, many of our brethren striving to get on in this crippled manner.

The help of an assistant is, in my judgment, not less necessary in the operation of filling teeth, and that is a faulty method which undertakes to dispense with it. I am not unmindful of the fact that many "good men and true," think they find in the automatic or the electric plugger a perfect substitute,—*I* can *not;* nor am I unaware that some others, following the example of that apostle of thoroughness, the late Dr. Varney, find no method so proper as that of malleting for

themselves. I think it demonstrable that a hand mallet, wielded by a proper assistant, will enable the operator to save a notable percentage of time over either method, and if this be the case, certainly the interests of ourselves and our patients will be subserved by its general use.

Did time permit, I might fortify my views by further specifications, as, for example, the use of unsuitable forms of material and of instruments in the filling of teeth, whereby the operations are needlessly prolonged ; for, notwithstanding all the teaching—and possibly in consequence of much of it—that has been given on the subject, one may be permitted to doubt that there is nothing more to learn. But trusting that what I have already said may prove suggestive of thought and discussion, I will bring these desultory remarks to a close.

CHEMICAL ACTION BETWEEN MATERIALS USED FOR FILLING AND TOOTH STRUCTURE.

Read before a union meeting of the Fifth and Sixth District Dental Societies of the State of New York, by S. B. Palmer, M.D.S., Syracuse, N. Y.

Mr. President and Gentlemen : According to appointment I present the following paper, in relation to Chemical Action between Materials used for Filling Teeth, and Tooth Structure.

My aim throughout has been to clearly define a natural law, which, as every chemist already understands, underlies the composition and decomposition of all matter. Similar ideas were expressed in a paper published in the Dental Miscellany, to which Mr. Thomas Fletcher, F.C.S., of Warrington, England, seems to take exceptions ; as may be seen in a subsequent number of the same Journal. We most cordially welcome the review of our brother, and concede to him the right of "different conclusions." The criticisms, however, were made from a misunderstanding of my meaning, and therefore have but little scientific relation to the subject under consideration. I have carefully examined other articles written by Mr. Fletcher, noted the care he recommends in manipulating materials for fillings, and the success claimed as a reward for such skill, and compared the same with the chemical laws which he rather hastily criticised, and I find no want of harmony. We start our investigation from points as distant from each other as are the cities in which we reside. By experiments and practice he has overcome many serious objections in the ordinary use of plastic

fillings, and claims to secure universal success. Success is obtained by the observance of laws which will inevitably secure the same end. He tells us how to do the thing; this is practical. My article was from a chemical standpoint in which is set forth the action produced by one element when brought in contact with another. In the results there is harmony, and I see more reasons for congratulation than controversy.

To avoid similar misconceptions, the following is presented in language, and by figures, that we trust will be comprehended by every one. Nearly all matter, whether simple elements or compounds, when brought in contact, or close proximity with varying elements, under favorable circumstances, excite chemical action, which not unfrequently decomposes, or changes the structure of one or more of the elements, and often results in the formation of a new compound, totally unlike any of its constituents.

Among the numerous forces or agents that favor such changes in matter, the most prominent are heat, light, electricity, fluidity, or moisture.

A thorough knowledge of chemistry would be required in order to understand the complicated action of these forces; therefore we limit our field of observation to the action which usually takes place in the oral cavity, influenced by gold and tin, as used for filling teeth, in connection with the fluids of the mouth, and the tooth structure, in which such fillings are inserted. Time forbids the application of the same law to amalgam, and other materials which could not be considered less interesting. Chemistry asserts that all matter which is capable of conducting electricity, when attached to, or brought in contact with other portions of unlike substances, in connection with a fluid or moisture that in any degree will act upon one or more of the elements, chemical action is set up, which in time will materially change the elements or compound acted upon. Such action may be intense and visible, like the mingling of an acid and alkali, or it may be silent and imperceptible, and only noticeable by contrast, like the slow conversion of new wine to old. Chemical action, whether intense or feeble, is productive of a corresponding current of electricity or galvanism. It is by this current, aided by a galvanometer, that we are able not only to determine the degree of action excited, but may read the relations which one element bears to the others, and decide upon which falls the loss, or, in other words, which is undergoing decomposition. This knowledge is obtained from the fact that all materials hold *relative*, positive, and negative electrical relations. We say relative, because

such relations are changed by the presence of other materials or fluids, so that the positive in connection with one element becomes the negative in the presence of another element, or exciting fluid.

Thus in the galvanic cell where copper and zinc are used as plates, the copper assumes the negative, and the zinc the positive, the latter only is consumed : by substituting gold for zinc, the copper plate at once becomes the positive, the gold negative. The copper plate only will be acted upon. This is a simple statement of the law, upon which rests the action which is going on between fillings and teeth, as well as other materials. One figure more, and we venture to give the results of this law in its workings upon the dental organs.

Take a piece of iron and divide it in two equal parts ; to one attach a piece of gold, to the other a piece of zinc. Expose the two pieces alike to moisture, acids, etc., and you will readily see the change wrought in the iron by such contact. In connection with gold, iron is rendered positive, and shows its condition by oxydation : with zinc, it assumes the negative relation, and resists oxydation.

Let us carry this figure to the oral cavity, and imagine the necessity of these supporting a fixture made of iron. Who would think of allowing gold or platinum to come in contact with such an instrument ? Certainly not an intelligent chemist. On the contrary, for its preservation zinc would be attached ; even a few grains would render it negative and less subject to oxydation.

We use iron as a figure. Other materials are subject to the same law, tooth structure not execpted, not affected to the same extent or degree as metals, but in degree according to its powers of conductivity, or resistance. Because a well organized tooth supports a gold plug during forty or fifty years without disintegration, does that prove that no such action exists, when the other extreme reveals failures in a less number of months?

Such being the fact, we compare success with failure, as every dentist doubtless has done, and we find a superficial cause, viz., difference in structure, and power to resist chemical action. All admit this, whether teeth are filled or not, some remain sound even in old age, others are acted upon and decomposed in a few years after eruption. The point I would establish is this: In those fallible cases, the presence of a negative element in contact with the teeth, be it a plug, a plate, or any appliance, excites or increases chemical action, and thus hastens decomposition. The structure most affected in the ordinary secretions of the mouth, are in a proper condition for increased action, by a nega-

tive element. Six year molars when first erupted; constitutionally frail teeth of the young; teeth of the aged in which the pulps have been devitalized, and not unfrequently the teeth of mothers during gestation and lactation furnish abundant examples.

As before stated, chemical action evolves the galvanic current which acidifies saliva, and thus aids in the production of an agent like an acid which irritates the vital organization of a tooth, and prevents further calcification or hardening of the dentine. On the contrary, any material, neutral or slightly positive to the dentine, which will shut out or protect the fluids from the tooth structure, will allow nature to perfect the work which, under chemical excitement, she cannot do. This principle is recognized in *fact* and *practice*, by the profession, without once giving a scientific reason why. I refer to the use of oxychloride fillings, as used under gold plugs; precisely the same electrical conditions are reached as would be by the use of metallic zinc, tin, or lead. Being an oxide, its conducting properties are materially lessened, as well as further decomposition, which renders it a valuable article for this purpose. [I see no reason why it will not come into general use without the fluid, simply to furnish a positive element in connection with gold plugs, which will also render the tooth structure negative to it. The quantity necessary would not need to exceed the amount left in the cavity, (if introduced as a paste with carbolic acid) after wiping out the cavity with any of the absorbents, merely enough to fill the sharp angles and scratches left in excavating.]

As critics must have material to work upon, I have included the above *suggestions* in brackets, as distinct from the paper I have prepared. They are untried, and may be classed as "*speculation*" or theory; the line of study in which I am engaged predicts that in the use of this preparation, the objections which I have urged against gold in particular cases, may be overcome, giving the advantage of gold, on account of hardness and cohesion, and that of tin as a positive element. I have often filled teeth with gold when I knew that, for a few years, other materials would best answer the end for their preservation. And why? Because our patients have been taught that gold is the best known material for a plug, and we could hardly expect to change their opinion by explaining a chemical law which the majority of the profession yet fail to comprehend.

There are two methods by which we gain knowlege, or receive truth. One is by scientific reasoning and study, the other by gathering together facts. Therefore, whoever is in posesssion of facts has the best of the

argument, though he may be ignorant of the law by which such results could be explained. People before Newton's day knew that an apple unsupported would fall to the ground; yet it was necessary to wait his coming, to explain the law of gravity. Whether we are in possession of facts, and, like Newton, discern the law, or, like Jenner, possess the science that could establish the facts in relation to vaccine, the end gained is the same—we are reminded of the common saying, "Facts are stubborn things." Hold on to them, and be cautious of all theories and so-called science that disagrees therewith. We have repeatedly heard statements from honorable and reliable members of the profession, respecting the superiority of tin over gold for filling frail, chalky teeth. It is well known that tin oxydizes, and is regarded as a cheaper material for filling, which renders it unpopular with the patient, and unprofitable to the dentist. The value and purity of gold need only be mentioned in contrast, to receive an introduction. "A little learning is a dangerous thing," if we believe the accepted notions and superficial teaching of chemical and electrical science, respecting its operations in the oral cavity. Just at this writing I am rejoiced to learn that our brethren in Europe are in possession of facts, though without chemical law or scientific explanation. We quote from the discussions of a paper read before the American Dental Society of Europe, in Geneva, Switzerland, July 2d, 1874, by Dr. C. M. Wright, of Bessel, Switzerland. Subject, "What does experience teach to be the best material for filling teeth?" Dr. Abbott, of Berlin, says he "has never used amalgam, but has favored Abbey's soft foil in certain cases of very soft, chalky teeth. Has for a period of twelve years occasionally used gold and tin foil together, in the following manner: a sheet of gold foil is laid upon a sheet of tin foil, and cut at proper widths for the cavity, then rolled between the finger and thumb, into a loose rope, the tin being outside. This is introduced as any rope filling, not requiring so hard pressure as gold alone, yet making a harder filling than tin alone. After this filling has been in a few months, the surface is found oxydized like an amalgam, even upon cutting into it; but the walls, sides and bottom of the cavity, even after years, have remained very clear and free from further attacks of caries. The combination of these metals from the electrical or other effects, have proved, in these very soft teeth, a very valuable agent for their preservation. [Great surprise was expressed by the Society at this novel method.] I do not claim this as my method, but a friend recommended me to try it, twelve years ago, and practice has proved it a

very valuable one to me—hoped the Society would try it, no matter what scruples or theories they may entertain, and report on it next year. Several dentists in Berlin are using it in their peculiar cases. These methods were discussed by the Society, and the opinion prevailed that the injurious electrical effects would condemn it ; but as Dr. Abbott has had twelve years' experience, and has carefully noted the results, the discussion was really, *Theory versus Facts.*"

The above quotation is exactly to the point. We would go a long way to shake hands with Dr. Abbott, and encourage him to hold on to chemical facts, which, by the aid of science, will in time convert the dental profession of the world.

In this instance we can appreciate the remarks of Dr. Atkinson in his censures to the profession for an undue adherence to books.

All dentists cannot become familiar with electrical science, which in itself is yet far from our comprehension, yet most have some general knowledge, and have adopted a common theory, drawn from the action of metals in fluids, as witnessed in the various batteries used for chemical and mechanical purposes, whose action is so varied from that limited to the oral cavity, that no wonder the discussion above referred to was rendered theory versus facts.

In recapitulation of the law already described, let us consider its relations to the practice just quoted. We have here introduced three chemical elements, gold, tin, and tooth structure, excited by the ever varying fluids of the mouth. Gold is a negative element, tin is positive, dentine passive, positive in relation to gold, negative with tin. Gold and tin were united, whether by a knowledge of chemistry or not, the tin was scientifically placed in contact with the walls of the tooth, rendering the latter negative. The soft, non-cohesive properties of tin, render its introduction a matter of ease, as compared with gold, thereby excluding the circulation of fluids between the elements. The surface only is subjeet to oxydation. In this connection I will report a case in my own practice, to show that in a compound filling of gold and tin, no harm will arise if portions of the gold come in contact with the walls of the cavity, as indeed it must have done in the cases reported by Dr. Abbott. Early in my practice a lady applied for cheap fillings in the superior incisor and cuspid teeth. An examination showed such neglect and want of appreciation of dentistry, that gold as a material was out of the question. My pride of reputation excluded amalgam, therefore tin was used in the following manner : In those cavities where tin would render the enamel opaque, gold linings were

applied in a manner that gave the enamel the appearance of having a gold filling, while other portions of the plug were like ordinary tin filling. A few other cases were treated in like manner, but soon I learned of the destroying effects of a combination of metals, abandoned the practice, and wondered that I should have been so ignorant.

At least eight or nine years after the introduction of the fillings mentioned, the patient called, and to my surprise much of the work remained, the gold still bright and clear to be seen beneath the enamel, the tin in some cavities was nearly worn away.

Here were "facts versus theory." From that day to this I have believed in a law not defined in any dental work, which has come to my notice. Having a taste for the study of electrical science, for nearly a score of years I have pursued it as a pastime study. The knowledge thus obtained enabled me to define the law of chemical action in the oral cavity by which teeth in a poorly organized condition are better preserved by tin than by gold fillings. Since knowing that teeth may be scientifically filled with tin, lined with gold, I have had no occasion to introduce the practice.

I have endeavored to describe the kind of teeth to be benefited by tin fillings. For others, gold stands king of materials, and there is no indication of its being dethroned.

Amalgam, which at present is so freely used, possesses some of the preservative properties of tin in arresting decay, but from the hasty or ignorant manner in which it is introduced, it is not as reliable. Its success or failure, however, is not a matter of chance, but the result of an invariable law, which, if understood and heeded, would enable us to escape its pernicious effects, and enjoy its benefits.

Like compounds subjected to the same treatment, and under the same influences, always give the same results.

Success or failure, good or evil, are effects of natural laws.

This statement may lead the critic to call for a definition of the law by which opposite metals convey shocks or galvanic irritation to pulps or sensitive dentine. It is this; electricity in its passage seeks the best conductor by the shortest route. We may close the hand upon the poles of a most powerful battery or induction coil; so long as the metallic surfaces are in contact, no shock will be perceived, but on separating the poles, that portion of the hand or body directly intervening becomes a part of the circuit, as the nerves will testify. Apply this rule to a compound plug, inserted for the purpose of hardening the material, (for tin alone will render the dentine negative), and we

have the elements in immediate contact, the pressure of the plug against the walls of the cavity excludes all fluids and circulation, no action takes place, except upon the surface of the plug, no current passes to the tooth, and consequently no irritation is communicated to the most sensitive dentine.

Opposite results, such as facial-neuralgia, shocks of the dental nerve, come of allowing two distinct fillings of different materials to become connected. There are two classes of this disturbance. First, such as comes from the contact of two plugs in opposite teeth. Second, from fillings in the same tooth.

The most striking cases are those originating from a circuit formed by outward contact of two fillings of gold and tin, or gold and amalgam situated in opposite or approximate teeth, the other portion of the circuit being made through the pulp and apex of the roots.

This outward contact is not unfrequently brought about by change of position of the teeth after being filled, by closing together. A slight space may intervene, connection being made through a conducting medium, like food, salt and acids, which are better conductors than the natural secretions.

The second method is by two or more plugs in the same tooth. A well organized tooth may entertain fillings of various materials if detached, without harm. But when upon the surface, such plugs become connected by any conductor, that portion of tooth structure between the plugs also becomes a portion of the circuit. Like separating the poles of a battery in the hand, the irritation is limited to the one tooth and pulp.

In the foregoing paper I have endeavored to explain the laws governing chemical and galvanic action in its operations upon tooth structure and the materials introduced into the oral cavity. I believe when these laws are better understood, as they will be, dentists will be able to write *success*, where now they are too often compelled to record *failure*.

CONNECTICUT VALLEY DENTAL SOCIETY.

The twelfth annual meeting of the Connecticut Valley Dental Society was held at Haynes' Hotel, Springfield, Mass., Oct. 13th and 14th, forty-eight members present.

Officers elected : President, J. J. Anderson; First Vice-President, A. F. Bishop; Second Vice-President, H. W. Clapp; Secretary, L. C.

Taylor; Treasurer, E. M. Goodrich; Executive Committee, W. H. Jones, A. W. Howland, E. A. Stebbins.

Ex-President Miller's address was a spicy production. Subject, "The World and the Flesh."

The doctor spoke of the great responsibility resting upon us when we are called upon to restore a tooth, and convert it from a tormentor to a comforter. He wished to impress upon the mind of the young practitioner that success is a ladder—if we press every round, by and by we attain the top; but if we wait for chance, the top never is gained. We all mean to be good dentists, but some know too much already; tell them anything, and they will inform you that they were well acquainted with it years before. Many enter the profession supposing it to be a life of ease, and only find they are too lazy to work common foil, (even when trusted for it.) Others are very ambitious, which fact soon becomes known, and the frequent result is, overwork and failing health:—Here the doctor would add a word of caution, as health once lain down is not easily taken again—for when nature's law is broken, the penalty must be paid.

The remainder of the afternoon was spent in the discussion of Irregularity and its Treatment," and "Prevention and Cure of Proximal Caries"—some advocating Dr. Arthur's method, and others condemning it, believing if God has put a good set of teeth in the head of a child, man has no business to cut them away after Dr. Arthur's theory, fearing they may at some future time be found decayed.

Caries having commenced, and the case being placed in the hands of the dentist for treatment, he should rarely, if ever, put in a temporary filling; for it so often conveys the impression that the teeth are all right, until so long a time has elapsed, that the patient finds the so-called temporary filling has wasted, and an aching tooth reminds him he was to have appeared for further treatment some months previous.

Evening Session: Riggs' Disease was introduced by the reading of a paper by Dr. Brackett, and the discussion continued by Drs. Riggs and Atkinson.

The morning session was occupied by a long and lively discussion upon "Gold Foil, its essential properties, its preparation, and instruments adapted to obtain the best results."

Many different kinds of foil were discussed as to merits and demerits. The prevailing sentiment being in favor of that variety which the most perfectly presents that essential quality—adaptation.

The majority of those present, after years of experiment, have found

themselves gradually coming back to the common soft foil, for general use, believing that brightly polished fillings are very beautiful to the eye, but the dingy gray appearance so common to many fillings, show to the more intelligent operators that the operation, once so beautiful, is soon to prove a failure, compared with many of those old fillings made by faithful hands twenty and thirty years ago.

Dr. Atkinson remarked upon the impossibility of considering so wide a subject in so short a time.

If a cavity be perfectly formed, it may be filled with the poorest of gold, if the walls be perfectly adjusted; the result will be, a tooth that will last ten generations.

Dr. Riggs believes discoloration to arise from different causes. To prevent it, a perfect joint is necessary—does not believe it can always be made with 120 or 240 adhesive foil.

Dr. Leash: We overlook the main point at issue; that property which adapts itself to the walls of the cavity is what we want, and not the uniting of the surfaces of gold to each other. A good cork filling will preserve the tooth as well as one half of the gold fillings made at the present day. Claims no superiority for soft foil over adhesive, only as it can be more easily adapted to the walls of the cavity.

Dr. Bartholomew read a paper on "Hemorrhage after Extraction," dividing his subject into three parts, Arterial, Veinal, and Capillary, describing diagnosis and treatment of each.

Adjourned to meet in Northampton, June, 1875.

Holyoke, Mass. L. C. TAYLOR, *Secretary.*

NEW YORK ODONTOLOGICAL SOCIETY.

A regular meeting of this Society was held at the residence of Dr. J. W. Clowes, Tuesday evening, Nov. 17th, 1874, President A. L. Northrop in the chair.

Dr. W. A. Bronson, chairman of Executive Committee, offered the following minute upon the late Prof. Thomas B. Hitchcock, of Boston, which, on motion, was adopted, and a memorial page set apart for it in the record book.

"The New York Odontological Society desires to record the tribute due to the memory of Thomas B. Hitchcock, late one of our corresponding members. His death adds another name to the list of those whom the profession will do well to honor. A man of rare industry, and abun-

dant in resources so nearly allied to genius, all of which were unsparingly devoted to the education and advancement of his special profession.

The Odontological Society gladly accept the duty of keeping ever fresh the name of Thomas B. Hitchcock."

INCIDENTS OF OFFICE PRACTICE.

Dr. Gage: I have now under treatment, children from five to seven years of age, where the permanent inferior lateral incisors have come entirely inside the arch, with the row filled perfectly with the two temporary laterals. Now the question arises whether it is advisable to extract those lateral incisors in front and the canine teeth at once, in order to bring forward the permanent teeth, or defer the regulating until some future time.

Dr. Lord: I should say that if the permanent teeth were pretty fully developed, no harm would result from removing the temporary incisors, but do not extract the eye teeth. Much would depend upon the stage of development they had reached. I do not see but that the permanent teeth may be moved forward at once, and occupy the space, which would prevent the cuspid teeth from occupying it.

I have met with several instances during the summer, showing the excellent qualities of tin foil as a filling for decayed teeth. The teeth have been preserved for from fifteen to twenty years, and the presumption is that they were not filled in the very best manner either, at least with what we should regard at this day as indifferent skill. I have recently met with a gold foil manufactured in Boston, which works the most like tin of anything I have ever used, and hence I think it is the best gold foil that I have ever seen. I used the foil manufactured by this firm for some time, but recently it declined in quality, and I wrote to them that it was not so good as I wished, and they sent me at once a different article, which is certainly the best foil I ever used. It is very soft, and at the same time very tough.

Dr. Francis: In regard to the question raised by Dr. Gage, I can see no reason why it would not be advisable to extract those deciduous incisor teeth at once, if the permanent ones were nearly perfected.

Dr. Lord's speaking of tin foil brought to my mind a case that I recently saw. Dr. Riggs, of Hartford, some twenty years ago or more, filled a right superior bicuspid with tin foil. It was decayed on the anterior surface, the cavity extending across the crown of the tooth. Quite a large tin foil filling was put in. After using that tooth for perhaps ten or fifteen years, one of the cusps was broken off, leaving a

shoulder of tin foil standing out prominently. I saw it some time after, and simply filed it down. I saw the tooth recently, and it is in a fine state of preservation yet.

Dr. Palmer: I have been for the past two or three years connected with the Ohio Dental College, and the subject of treating children's teeth has frequently come up there. So far as my observation goes there is a tendency toward extracting teeth prematurely. From what I have seen, read, and practiced, I think that there is more deformity produced in the mouths of children by extracting teeth too early than by letting them alone. When permanent teeth have made their appearance inside or outside of the temporary teeth there can be no objection to removing the temporary teeth at once. Further than that, no extraction should be practiced. In the case Dr. Gage has cited, I think it would be correct practice to extract those teeth standing in front of the permanent teeth. But to go further and extract cuspids to make room for the permanent incisors, would be bad practice. The tendency would be for the teeth to spread like a fan, and as the permanent cuspids erupt they could not take their proper position.

Dr. Atkinson: My experience has been like what Dr. Palmer has stated; that premature extraction does more harm than good, and that it is often resorted to when it should not be. When the teeth first come through, it should be borne in mind they are as large as ever they are, but the jaw continues to grow, and consequently will give more room. Therefore, unless the temporary teeth are loose, or the permanent teeth make their appearance as described by Dr. Gage, it is best to leave them, and let the jaw continue to expand.

Dr. Clowes read the following, and asked the Society to give it a thorough and impartial discussion.

Dental Contact.—My text is this:—"Contact among teeth is one of the most frightful and prolific sources of disease. It invites the attack and provides a secure harbor for inimical forces."

Plain and emphatic as this language is, self-apparent and real as the facts are, strange to say there is no truth that seems to be so generally ignored. Why, is a riddle I am daily striving to read; a problem of human perception that finds no solution. Divest yourselves, as I do, of all prejudice, and you may see in almost every mouth the certain evidences that contact among teeth is always a danger, and its presence a constant menace of evil.

Dr. John Allen: It may be that I am obtuse, but I cannot apprehend what is meant by dental contact. If it means the teeth touching

together, it seems to me that that is the order of nature. If they touch each other unduly, that is a slight departure from the order of nature; if they touch each other excessively, so much so that it is very difficult to intervene any foreign substance, such as floss silk, that is a still greater departure. The evils, however great they may be, will be just in the order of succession of the three propositions. In the first place, if they simply touch each other, I cannot see that there is any objection to it. Nature does not seem to have apprehended any objection. In the second place, if they touch each other a little unduly, I think a little extra care in keeping them clean will avert all harm. If, in the third place, they are unduly crowded together, so much so that it is difficult to intervene any foreign substance, that is objectionable. The first two propositions are hardly worth discussing. The third very properly might be discussed.

Dr. Dwinelle: Simple contact is not objectionable; I think, on the contrary, it is desirable that there should be at least contact; I think the healthfulness of the gums requires it. When there is considerable space between the teeth, mastication of the food is oftentimes a source of pain, and generally causes irritation to a greater or less extent. In simple contact we can introduce floss silk, or quills, to remove foreign substances and avert any possible evil that might accrue. We know that the teeth are surrounded by a pereosteum which sets in another pereosteum. There are two pereosteums intervening and butting together, forming a cushion, so that our teeth are not absolutely in contact with the alveolar process. By no means, as we prove every time we bring our mouth together, we bring our teeth together in complete articulation. We can give another effort and feel them settling in our mouth. It is a wise provision of nature, and it extends through the whole physical economy, not being confined to the teeth alone. We see it in the case of the vertebræ, which nature has not only provided with a delicate cushion in the form of membranes between every vertebra, but has given to the whole such a curvature that it is on a constant spring. Otherwise, a man could not take a step without producing concussion of the brain. I repeat, I do not consider simple contact objectionable. In the second proposition of undue contact, cleanliness *must* be the rule, and in the third proposition, possibly separation. It depends altogether upon circumstances. There are so many circumstances to be taken into consideration in treating a particular case, that the good judgment and skill of the operator is the only proper guide.

Dr. Lord: I do not think simple contact contributes to decay,

and I think it is most desirable rather than to be deprecated, and simple contact, or at least some contact, should always be observed in separating the teeth. I have a good deal of confidence in the separation of teeth as a preventive of decay, however, and I practice it to a considerable extent ; but I take into consideration the class of teeth, and I want them to be sound, or nearly so, when I make the separation. If decay has already commenced, if it has penetrated the enamel, I have not much hope in separating such teeth with the object of arresting further decay. I think decay will recommence, and for more than one reason. It is rarely that sufficient care will be taken of such a surface as to prevent further softening. It is the extent of surface in contact, and not simple contact, that is the cause of the trouble, and in separating, I should try to maintain the shape of the teeth as much as possible. That is, I would not leave a flat, but an oval surface. I would by all means leave a point of contact to preserve the gum in a healthy condition, or rather to prevent anything passing up to the gum. I don't think the disk should ever be used between permanent teeth. On temporary teeth I think it may, to cut away the approximate surfaces of the molars. I don't think the file should be used to any extent in such cases, but instruments of a chisel shape, in order to maintain the point of contact.

Dr. Atkinson : I think this is, like many other questions that are put as posers, stated with apparent confidence, their author knowing them to be errors, on purpose to see them knocked over. How any rational man can make the statement honestly and earnestly, that the three propositions contain, utterly obfuscates my understanding of the law of physiological activity. We seem to ignore entirely that we have a bundle of possibilities in every tooth, as we have in every other individual organism on the planet, and it depends upon how they are observed, what the result will be. You may throw a well organized set of teeth, where each tooth is perfectly up to the standard in all its parts, or up to the possibility with which it is endowed, into any position you please, put them under all sorts of deteriorating influences, and you won't get any decay. You will get them polished on their surfaces so that their faces will be bright and shining when extracted, as seen repeatedly in teeth of old men. Contact is nature's law everywhere : you get no action without contact. We are considering organic action in this case, and more particularly the question of disintegrating action ; we get here chemical and mechanical abrasion. When it is simply mechanical it merely polishes the tooth : if you add to that the deleterious in-

fluences of chemical action, then you will get a bad state of affairs, a condition that will call out all your energies.

Do teeth need contact? I say yes. It is an associated thing—a matter of machinery. When there is one tooth brought into service alone, it is not a step toward power, the tooth needs support; it is a sort of social arrangement that is intended by nature. I do not want teeth to stand so that they are bound, and in separating be sure you have a healthy tooth; you can always get something between them to ascertain their condition. If in passing floss silk between the teeth you find that some of the fibres are broken and torn out, you may be very sure matters are wrong. If we understood the functions of the body we should know that contact and pressure, to a greater or less extent, is a necessary element. Nature never does, under proper circumstances, develop a tooth that is at all imperfect; and when I say proper I mean the circumstances according to the type of the organization.

I can easy enough conceive how a man who has to deal altogether in his practice with the little miserable, half-begotton, three-fourths gestated, and then about three-eighths born children we have in this community, and has their teeth in hand, may be afraid of contact. The soft and imperfect texture of such teeth is crumbled by contact, but contact is not really the source of mischief. It is the concomitant, and not the cause.

Dr. Clowes: I have told this Society before, things that were not at first apparent to it. I had the pleasure of bringing before it the discovery of Dr. Barnum. At the time there was scarcely a man saw the importance of that thing. I told you many years ago, and I have constantly kept telling you, that amalgam was one of the best fillings in the world, and I guess you are beginning to think so, now.

Another thing I have been battling for, and that is the extraction of the six-year molars as one of the best things ever done, and that has a great deal to do with the subject I have propounded here to-night. The six-year molar is the great cause of excessive contact, and the great cause of decay among teeth. When we take that tooth away, if at the right time, we avoid this contact. Give nature a chance, and she will place teeth as they are there, (showing set of teeth). Where she has not an opportunity, they will be found close together, and where you find them close together you will find decay.

Dr. Kingsley: What is Dr. Clowes' explanation of the fact that among certain races of mankind now on the face of the earth, and among certain races that have existed before this, and of whom the evi-

dence remains, so that we can get at it with great certainty from large collections of skulls, that the teeth are in as absolute contact with each other as it is possible for them to be in accordance with nature, and also, as is almost universally the case, that there is no decay on the proximal surfaces, and very little other decay.

Dr. Allen : At the creation, when God established His laws, he established them upon facts that would stand the test of time. When he made the laws for the development of man, those laws were substantially correct. There was no defect in these laws ; the Creator intended the six year molars to be there as much as he intended the second molars to be there. He intended that there should be just as many teeth as a well-developed jaw presents. Now, that we shall interfere with that law I think is wrong. Let nature have its due course, and help it, rather than undertake to remedy evil after we have violated the law.

How do we stand as a nation ? We refuse, virtually to choose the materials that give a sound and healthy development to the jaws and teeth. There is the origin of our whole difficulty. There is probably not a nation on earth where there is such a prevalence of decay in the human teeth as in the American. Probably not a nation on earth where there are so many dentists, and so good ones too, as here. Let us go to the root of this matter. It is not contact of the teeth ; that, I think, nature intended, and that each tooth should be a support to the other. But we should use the materials for food that contain in sufficient abundance the proper nourishment of these organs. We have fourteen substances forming the human body, sixteen, including the hair and nails, and these constituents are contained in the articles of food designed for man, and among those articles of food, there is one that is called "the staff of life," that is, bread. The Creator placed in the hull of grain, some of the most essential elements in the "staff of life." These are the phosphate and carbonate of lime, so necessary to a well developed tooth. We refuse its use, and it is here in a very vital point that we violate the laws of nature. It is estimated that every child consumes a half barrel of flour a year. If that child is raised on fine flour, it is denied some twenty pounds of this mineral element which should be taken into the system, in order to develop the bones and teeth.

The result is that the teeth are not organized as they should be, and we have this abnormal condition. When we look at other nations, we perceive that their habits of diet are different. When we go among

a people where there is nothing done to change the proportions of these sixteen constituents, but where they are taken just as our good Father has furnished them, we see that those races do not lose their teeth.

Now I am confident I am right in this matter, and that we can do more by correcting a violated law to remedy the evil, than by going still further, and violating another fixed law with a view to its prevention.

Dr. Clowes : I am speaking to-night mainly with reference to our American constituency. I don't know anything about the Europeans, the Hottentots, or the Indians. We do not operate for them. I do not say nature did wrong in giving us thirty-two teeth. I only say that from the fact that we do not live right, we find decay does invade our teeth. We drink acids, and of late years the physicians have invented a good many acid medicines that make sad havoc with the teeth, and I find if this contact can be avoided, they do not have the opportunity to act, as they do when they are close together.

Dr. Latimer : I want to say a word in aid of Dr. Clowes. It is this : that if every alternate tooth were extracted, the tooth would not be so likely to decay, but you would not get much benefit from the teeth, I think, nor would it be considered good practice.

I do not remove the six year old molars when I can save them, and yet there are cases when that course would be advisable. We have seen cases where decay has commenced in teeth when they were in contact, and, on removing the adjacent teeth, decay has ceased, and for years that tooth will remain there without further progress of decay.

Dr. A. H. Brockway read a paper entitled "Dread of the Dentist." (See page 486.)

Dr. Dwinelle congratulated himself and the members of the Society, upon the auspicious indications for the future which the meeting afforded. They had passed a very pleasant evening, and discussed a knotty subject, that promised to provoke heat and acrimony of debate, in a proper spirit and in a lively and suggestive manner. He was also much instructed and entertained by the short, but exceedingly sweet paper presented by Dr. Brockway. He thought he had said many things regarding the duties and courtesies due to patients at their hands that were true ; that he had specified and illustrated them in a happy manner, and he trusted his brethren would practically adopt the lessons it contained, and that at once. Adjourned.

WM. JARVIE, JR.,
Rec. Secretary.

FALLIBILITIES OF SCIENTIFIC EVIDENCE IN MEDICAL JURISPRUDENCE.

By A. C. Castle, M.D., New York.

Hamlet.—Do you see yonder cloud that's almost in the shape of a camel?
Polonius.—By the mass! and 'tis like a camel, indeed.
Hamlet.—Methinks it is like a weasel.
Polonius.—It is backed like a weasel.
Hamlet.—Or like a whale.
Polonius.—Very like a whale.

The vital importance of the Science of Toxicology must be sufficiently obvious to every person who is an observer of, and takes an interest in, the common occurrences of life. To the philanthropist the knowledge of the extent of human misery occasioned either by the accidental or improper use of poisons must be extremely distressing; and cases of murder, suicide, and accidental death have become so common from their frequency, that we can scarcely peruse a newspaper or study the weekly death statistics without finding that their number is constantly on the increase. To the medical practitioner a correct knowledge of Toxicology in all its comprehensiveness is paramount; to him, in case of positive or supposed poisoning, is committed the life of the patient, as, also, the life of the accused, together with the happiness and welfare of their respective families, which may all be sacrificed by a want of knowledge, presence of mind, or promptness in decision and proper action at the moment that these may avail. To the jurist a knowledge of the Science of Toxicology and that of Medical Jurisprudence is absolute and supreme.

The medical jurist derives his toxicological resources from *Semeiology*, *Pathology*, *Chemistry* and Physiology. By *Semeiology* he ascertains the difference between the symptoms occasioned by poisonings and those produced by natural causes; by Pathology, he discriminates the morbid appearances indicative of death by poison from those produced by the natural cause of death; by Chemistry, to discover the substance of those poisons acting upon the organic structure, and those that destroy the vitality of the body, and to separate the poisons from the contents of the stomach, intestines, &c., and practically demonstrate them; by Physiology he determines the value of evidence by analyses, and by direct experiments made upon the inferior animals—the dog, the cat, rabbit, frog, &c.—by which he confirms his experience. Microscopy is used as an adjunct.

Medical Jurisprudence comprehends and depends upon all that pertains to Natural Philosophy for practically demonstrating the attributes of medical knowledge. As truth and facts are the unquestionable *desiderata* to be arrived at before a court of justice, we may fear that they are too often sacrificed by scientific incongruities, and vagaries of legal "rulings." The intention of Medical Jurisprudence is the detection of, and fixing the character of the crime, and the *vindication of innocence.* The necessity of infallibility here cannot be overrated nor exaggerated. The importance, then, of a rational exposition of evidence too often brought to bear upon the *science* of Medical Jurisprudence may serve to throw some light upon this important and truly interesting subject more than can all the vaulting erudition of chemical experiments practiced upon the lower order of the animal creation, whose pathological and physiological variations, however closely analogous, still differ from those of man. The fallibilities of scientific evidence, therefore, present themselves for serious thought and consideration, affecting, as they may, not only a single individual, but each and every family, as well as the community at large.

With this proposition before us, we are aware of the high position we assume, and upon what critical ground we tread, and with what a nervous, susceptible body—the scientific body—we have to contend. For have we not to struggle against the fetters and trammels of time-honored usage; with long established precedents and prejudices? Have we not confirmed and fixed plausible theories to contend against, and to oppose ages of established laws created and based upon "the highest human wisdom," as well as to combat the influence of name, fame, and scientific reputations of accepted great philosophers—recorded authorities? In addition to these, have we not an exact and infallible science to fight against, and the wondering, gaping multitudes, who, totally ignorant of chemistry and the laws of natural philosophy, verily believe that chemical art can separate a loaf of bread or any other compound materials into their elementary proportions and constituents, and re-combine these again into their previous shapes, and who accept the evidence of experiments and speculation as immutable truths?

But when these scientific methods are brought to bear against Life, Liberty and Character, it behooves us to demand positive, irrefragible evidence, and exactness that shall be as open, as broad, and as demonstrable as are the movements of the celestial bodies.

The cases of celebrated trials we have here collated amply exhibit the fallibilities of scientific evidence, the defects of which cannot be too seriously studied and impressed upon the mind of the philanthropist.

Lady Duff Gordon, in her publication of "Naratives of Remarkable Trials," from the Criminal Records, vol. VIII., states "That no fewer than six persons who had been convicted of capital crimes at the Old Bailey, A. D., 1827, and left for execution, were proved to be innocent by the zeal and activity of the sheriff, and were saved and restored to liberty." We refer to this simple statement, not to adorn our collation, but that it may serve to point the meaning and the moral of our paper.

The records of celebrated trials within the last fifty years present too many proofs of the unreliable nature of scientific experiments put in evidence, and forming the basis of Medical Jurisprudence. In parenthesis, we may observe that almost in each day of the year the morgue and the coroners' inquests offer opportunity to the Toxicologist by which he may test and prove the correctness of the principles of the important science of analysis as used in Medical Jurisprudence. Very many people, now, according to "Crowner's Quest Law," die of "disease of the heart," of "apoplexy," "paralysis," "Bright's disease of the kidneys," &c., and "cause unknown." In how many of these cases, might the toxicologist, by scientific experimental research, prove that death was the result of poisons accumulated in the body, as for instance, copperas, arsenic, strychnine, tobacco, opium, coculus indicus and other poisons taken into the system in adulterated food, and wines, spirits, liquors, beer and cordials, &c. In this way upon human subjects, they would prove their ability as analysts, and the infallibility of their tests. They would show that "infinitesimal atoms" of poisons can be found in these, as surely as in the bodies of those suspected of having been poisoned, which certainly would be more practical than cruel experiments made upon dogs, cats, &c., specially prepared to yield the evidence sought for.

Happily the recorded cases involving the science of Medical Jurisprudence (with two exceptions) have placed the public conscience at ease that the intention and ends of justice have triumphed, from the fact that murders have been discovered and proofs furnished, almost, as it were, by miraculous intervention, as if in accordance with an immutable principle of Eternal Justice—"murder will out"—rather than by the test of or application of scientific evidence. In all these cases positive, circumstantial, moral and legal evidences have, in an eminent degree, exhibited the legal and moral proofs bearing upon and supporting, and verifying *the weakest link*—that of experimental science—seldom has experimental science adduced positive evidence, or sustained or removed legal doubts.

Four or five years ago, the London *Telegraph*, upon "*A Question of Poisoning—Singular Revelations*," has the courage to speak. It says: "A brief announcement appeared in our colums, noting that sentence of death had been passed on a young woman named Frances Oliver, for the murder of her husband; but the case is too singular to be thus summarily dismissed. It involves a point of extreme importance in regard to what is termed Medical Jurisprudence.

But the most important and serious consideration—apart from the remarks from the Judge himself, citing, in favor of the prisoner, various facts which cast doubt upon the charge, arose from the testimony of the professional chemist examined. Dr. Alfred Hill, of Birmingham, whose skill and conscientiousness need not for an instant be questioned, had received two jars, one containing the contents of the dead man's stomach, the other containing the stomach itself, with other internal visceral organs. The membranes were slightly inflamed, but the *liver* was in a natural condition. Dr. Hill made trial of the stomach and liver, and of the intestinal canal and kidneys, by "*Reinsch's* test," which gave no indication of any poison *whatever*. When, however, he applied "Marsh's test," both to the liver and contents of the stomach, he obtained an extremely minute deposit of metallic arsenic. The hundredth part of a grain in these organs might have produced—as this gentleman allowed—the quantity thus made manifest. Now Reinsch's analysis does not fail where there is arsenic present in any considerable quantity, and Dr. Hill himself said that he could not furnish an instance where it had failed. Marsh's method is far more delicate. The compound suspected is burnt in a flame of sulphurated hydrogen, and if arsenic be there, the color of the burning jet is changed from a pale yellow to a grayish blue, while the substance itself may be collected upon a porcelain plate in minute flakes.

"IT IS QUITE IMPOSSIBLE," said Dr. Hill, "TO ESTIMATE THIS SMALL QUANTITY." Let the reader and public note well what was also put in evidence. Dr. Hill swore that he had tested his acid and zinc, to be certain that no such ingredient *lurked in them*; and no doubt he would be most careful, knowing that the life of a fellow being probably depended upon his report; but let it be observed that, although the acid would probably be homogeneous, the zinc might very well be free from the poisonous metal in *one* portion, and *not in another*, so that, with all possible care, it is not, and cannot be safe to rely on Marsh's test for the *positive* detection of poisoning by arsenic where the quantity discovered is very minute.

This point is of supreme importance, not merely as regards the guilt or innocence of the woman Oliver, but also in connection with the force of toxicological evidence in such cases. It is of the most grave and vital necessity, that if the testimony of chemistry be admitted in case of life and death, there shall be no gate by which injustice shall enter. But from this case, it would seem that while the expert tries the fluids and organs of the dead body, he may actually introduce the damning drug, in spite of all his precautions, and then report fatally against a person wholly innocent. The doubt is so fraught with possible disaster, that the Judge did well to give full force to it; his hesitation being further shown by the way in which he urged the insufficiency of the "symptomatic evidence," and recommended the jury the greatest caution in their deliberations. This woman's sentence, unlike Madame Lafarge's—who was ultimately pardoned—was commuted to transportation for life.

We cannot but commend the just and common sense view so lately taken by the London Press, predicated upon the truly scientific and conscientious evidence of Dr. Hill, adduced on the trial of Frances Oliver, and correctly termed by the presiding Judge, "symptomatic evidence"—evidence which fully endorsed and confirms our exposition, made thirty years ago. Our theme was "The Fallibilities of Scientific Evidence." In the case of Madame Lafarge, tried for poisoning her husband, reagents were used for detecting poisons, which, as we represented at the time, were in themselves impure. Too often the reagents contain the *exact poison* they are employed to detect—and therefore, not being positively and chemically pure, they may, in the process of the analytical experiments, bear false witness, and so become fatal to the accused.

There are natural diseases which commence, proceed, or terminate in the manner characterizing the symptoms attending poisonings. Nor are philosophers agreed upon the *modus operandi* of poisons in the human system. Coindet, Munro, Brody, Majendie, Barry, Christison, Orfila, Gay Lussac, Vanquelin, Royer, Robiquet, Ernment, Wildbeg, Liebeg, and others, present their several hypotheses and theories; some asserting that they act through the blood; others that they act exclusively upon the nerves, and through them destroy vitality. Physiologists differ from chemists in many respects.

It is worthy of noting, too, that very many toxicological deductions are derived from experiments made upon the cat, dog, rabbit, fowl, frogs, horses, asses, etc., whose pathology, physiology, digestion, and many

of whose secretions and excretions differ in very many respects from those of man. An important objection to this species of testimony, is that like "what is one man's meat is another man's poison," so the poison that kills one order of animals, "fattens" another order of animals. As well might these animals turn their attention to physiology and chemistry, and try the experiment upon themselves of the effects of turtle-soup, claret, hoc, burgundy, Rhine wines, champagne, etc., smoking and chewing tobacco. Yet animals subsist upon food a thousand times more poisonous to man than human luxuries would be to them. These experiments, if in the interest of abstract philosophy, unconnected with practical Medical Jurisprudence, may be acceptable as showing that the human system possesses several of the physiological opposites of the lower order of the animal kingdom. At the same time, they prove that no *exact* conclusions can in this way be arrived at whereby to hang a man.

With these facts before us, we are impressed with the unreliable character, and hence uncertainty of the poison tests generally used, as unsafe and unavailable for the purpose of detecting poisons. That many tests are uncertain because they are more likely to be *impure*, than they are to be chemically and positively pure ; and as they in themselves contain poisons, they are as likely to produce the results inquired after, as they would be to detect the poison sought for. At the time of Madame Lafarge's trial, we called attention to another important fact—a fact which, until that moment, had been entirely overlooked and unthought of, viz.: That nearly all the glass retorts, flasks, tubes, etc., used by chemists in analytical chemistry and experiments generally contained arsenic, and that although the tests used for analytical purposes might be pure in themselves, upon their being brought into chemical action with this glass, they will produce "the infinitesimal particle," the "imponderable" "breath of a trace" from the arsenicated glass apparatus used.

The recent trial of Mrs. Wharton, in Baltimore, illustrates our points. It would be difficult to decide which Medical Jurisprudence tried most, the court, the counsel or the jury. The testimony offered confusion worse confounded, and it necessarily followed that the jury exonerated Medical Jurisprudence of infallibility, and acquitted the accused.

Our remarks on poison tests, &c., were published in the New York *Herald*, and again in the Boston *Medical and Surgical Journal*, Vol. XLII., Nos. 10 and 16, 1850., in which we offered our views and ob-

jections in relation to the methods in use for detecting the presence of poisons—the case of Madame Lafarge coming within our notice.* A box containing two cakes was sent to M. Lafarge, her husband, who, after eating one of them, was seized with all the symptoms of poisoning. It was shown that Madame Lafarge on several occasions had purchased arsenic at a certain drug store, for the purpose, as she said, of poisoning rats. Arsenic was found in several places in proximity to the medicines prepared for her sick husband. He was told that his wife was poisoning him. He became highly excited, and expired. The authorities took the matter into investigation, employing four doctors to make the examination. They reported that the milk and sugar water, "*eau sucre,*" which had been given to the deceased by his wife, contained large quantities of arsenic; that the beer, gum syrup, and powdered sugar contained none, and that the matter rejected *from* the stomach was entirely free, while the liquids found *in* the stomach, did contain arsenic, concluding their report that the deceased had been poisoned with arsenic Sept. 2, 1840, at the town of Tulle, France.

[*To be continued.*]

DOES THE USE OF FLOUR PROMOTE DECAY OF TEETH?

By Ephraim Cutter, M.D.

There is no doubt that the decay of teeth prevails to an alarming extent, and it is very humiliating to our modern civilization to have it characterized so generally by the occurrence of diseased teeth. The ætiology of this disease is a great, broad, and deep subject. No doubt many elements combine together to cause it; and the person who should positively announce a single agent would be dismissed as unworthy of attention. Still it is a matter worth discussing, and deserving the attention of the ablest minds. To ignore is not to arrest; hence we offer a few suggestions for consideration.

"The *Chemical News* ascribes the potato rot to a deficiency of lime and magnesia in the soil. Different observers state the percentage of magnesia in the ash of sound tubers at from five to ten per cent.: in the diseased tubers an analysis shows only 3.94 per cent. Analysis of sound tubers shows over five per cent. of lime, but in the ash of diseased tubers only 1.77 per cent. was found. A similar observation was made some years ago by Professor Thorpe, with regard to diseased

*The Editor of the Boston *Medical and Surgical Journal* was pleased to observe as an introduction to *our* paper published: "The suggestions of our correspondent, Dr. Castle, respecting the importance of accurate scientific evidence in criminal cases, are important, and deserve the consideration of all medical men." Dr. Valentine Mott, the eminent surgeon, himself an accomplished chemist, did us the honor to commend our effort as being correctly pointed.

and healthy orange-trees; in the former there was a deficiency of lime and magnesia."

According to these authorities, a deficiency of mineral salts in the vegetations named is supposed to be a sufficient cause for decay. Now it is an interesting question whether there is any article of food employed by mankind which is deficient in mineral matter. If so, then it should be made known to every family in the land.

Perhaps there is no article of food more generally consumed than flour, *i. e.*, wheat flour. In the forms of bread, cakes, and pastry of all kinds, it enters into every house, and is universally used and regarded as the "staff of life."

Does flour possess a requisite amount of mineral matter?

To answer this question, Mr. Sharples, the well-known chemist, analyzed for me the "Peerless Flour." He found 0.55 per cent. of mineral ash, a little over half of one per cent. He stated also that the proportion of ash in the whole grain varied from 1.65 to 2.50 per cent. So that the diminution of mineral food varies from two-thirds to four fifths. In other words, *by the use of flour, mankind loses from two-thirds to four-fifths of the elements that go to make up teeth and bony structures.* This statement deserves to be written in letters of gold over the door of every bakery and kitchen in the land.

Flour has been used for generations, and if we can rely upon Mr. Sharples's statement, mankind has all this while been deprived of the greater moiety of the mineral food that the Almighty intended it should have the benefit of. Is it not natural to expect that the bony structures should suffer from this great withdrawal? For it is a *great* withdrawal. Suppose that a water supply pipe should be cut off two-thirds to four-fifths, would not the supply be greatly diminished? Cut off the same quantity of time from the hours of daylight; would not our darkness be great? Take away two-thirds to four-fifths of our muscular food; would not a strong man become very weak? Cut off air to the same extent; would we not lose our breath? And why should the bony tissues not suffer in like manner when their food is withdrawn? I think they do. Perhaps a little evidence in the contrary direction may throw light upon this.

A dentist, whose name is well known, said that he filled some fourteen cavities in the teeth of his first-born child by the time he was four years of age. He put his family upon the use of the whole grains, and the next child had no retarded dentition, and not a decayed tooth up to the same age.

The same gentleman says that the teeth which decay are not com-

pacted or knit together with the firmness of healthy teeth. There seems to be an arrest of perfect development. Though what can be more natural than to expect imperfect development and decay, when from two-thirds to four-fifths of the proper bone food is habitually withdrawn from an article of diet which is more largely used than any other?

How common it is to see infants not cutting any teeth at all, until they are twice as old as they ought to be. The good effect of the whole grain diet is shown in Dr. Harriman's second child, above alluded to. To be sure, it is only *one* case, and must not be made too much of.

Now what is to be done about it? Certainly one man's dicta amounts to but very little alone. What we need is evidence from others. Suppose that every medical association of Massachusetts take up this matter, have analyses of flour made, try feeding mothers and children upon the whole grains of wheat meal, oat meal, corn meal, beans, etc., and suppose they all come to the same conclusion as the writer has done. Suppose they officially announce the result. Would it be long before the general public would heed the truth, and thousands of persons would rejoice in the possession of that priceless treasure, a set of perfect teeth?

NOTE. — Through the kindness of Mr. E. H. Davis, Superintendent of Public Schools in Woburn, Mass., the writer has been furnished with the following *astounding* statistics, embracing returns from several of the largest primary schools of Woburn, a fair representation of the prevalence of diseased teeth among children :—

	No. Scholars.	With Sound Teeth.	Decayed.
Lawrence Primary	113	13	100
Plympton St. Primary	94	27	67
Highland St. Primary	71	25	46

[*Boston Journal of Chemistry.*

A TWO DOLLAR RECIPE FREE—GEO. MORRISON, D.D.S.

A circular dated Delavan, Wis., Jan. 1st, 1874, was extensively circulated among dentists about one year ago. It purported to emanate from Dr. George Morrison, of whom it says: "He is the oldest of the brothers of the Morrison family of dentists, and has attained some notoriety as an inventor in his profession."

On page 111 of DENTAL MISCELLANY for 1874, we republished the circular (without charge to the Doctor), also giving a copy of the recipe which the circular offered, on receipt of "two dollars;" and we further

explained that Dr. J. B. Morrison, of Engine, Chair, and Bracket fame, had no brother in Delavan, Wisconsin. We are now in receipt of another copy of the same invitation to give two dollars, except that the present circular is dated Dec. 1st, 1874.

Accompanying this is a new circular, on colored paper, which reads as follows :

"TO MY PROFESSIONAL BRETHREN.

DELAVAN, WIS., DECEMBER 1, 1874.

Gentlemen:

The enclosed Circular is an exact copy of one which I sent to the Dentists nearly one year ago. The general satisfaction my method has given, has prompted me to again offer it to the Profession, with several improvements from my own experience and the suggestions of Dentists from nearly every State in the Union. And if the Cummings claim is not for the application of Rubber to Dental purposes, but for the method of working it, as specified in his second re-issue, No. 1,904, my method affords entire freedom from infringing upon the Rubber Company's monopoly.

Respectfully, Your Servant,

GEORGE MORRISON, D.D.S.

P.S.—As the question is often asked, I will answer. You require no new apparatus to work my method. MORRISON."

For the benefit of our recent subscribers we append a copy of the recipe, sent last year in return for the two dollars.

COPY OF RECIPE RECEIVED IN RETURN FOR TWO DOLLARS.

Office of Geo. Morrison, Dentist, Delavan, Wis., 1874.

Dr..............................

DEAR SIR :—This is to certify I am in receipt of two dollars, which entitles you to my method of constructing plates for artificial teeth, which I enclose, trusting you will deem it a desirable acquisition to your laboratory. This shall be your recipe, as per circular.

I am your servant, GEO. MORRISON.

DIRECTIONS.—Take the impression with plaster as usual, scrape the centre where the hard ridge is in the arch, so that the plate will not rock. Make model or cast (put no salt in plaster for cast), scrape a little each side of the arch at the heel or back part of model, so the plate will set close to the soft parts of the mouth. To harden model, place it over vulcanizing lamp and heat gently till evenly warmed

through, so that the plaster will absorb the coating or varnish which is put on with brush. While model is hot, rub the face of the cast with pulverized soap-stone, to give it a polish. To prepare varnish for cast, common resin one-quarter ounce, alcohol one ounce. To make base plate, use Japanese tea lead (not from chests containing green tea, as it has not the required strength). Use three thicknesses, more or less, as you may desire, burnish on to model with plate burnisher. Fasten teeth in position with wax, same as with other base. Make plate of rubber or celluloid, as usual. By close adherence to these instructions you will be successful.

EDITORIAL.

RETROSPECT.—We have just re-read our Prospectus of one year ago, Page 1, No. 1, Vol. 1.

We well remember the feelings dominant in our mind when writing it.

Our purposes were good, and the plan for conducting a Journal as then stated still seems judicious—not that the year has wrought no change in our views—not that we then stated all that was necessary to the production of a readable and instructive Dental Journal—not that a readable periodical cannot be secured by other purposes and aims, but it still seems that there is a lack in existing dental literature which can best be supplemented in the way we have proposed for the MISCELLANY.

Each of the Dental Journals of the day has excellencies peculiar to itself, and each should be (if possible) in the hands of every active practitioner.

It is absolutely impossible that such a person can read twelve issues of any one of these repositories of dental information without gathering therefrom information, or being incited to trains of thought which will repay him many times the expenditure necessary to secure them.

Too much, in our opinion, has hitherto been thought by readers of Dental Journals, of the desirability of "original matter." The impression seems to prevail that all that is needed to make a publication desirable is "original matter." It would not be difficult to conform to this demand. It *is not* easy to conform to it, and still have all the original articles *interesting* or *important*. On the other hand, it is clearly undesirable that different Journals, designed for the same

class of readers, shall contain the same matters. It is for this reason that we have refrained, almost without exception, from offering our readers any article which has *previously* appeared in any of the current dental publications of our country. We have seen in each of them, articles of great and universal interest—articles that were spicy, interesting, instructive; but remembering that in our large family of readers are many who also read the *Missouri Dental Journal*, the *Cosmos*, the *Register*, the *American Journal of Dental Science*, or the *Pennsylvania Journal of Dental Science*, we have refrained from reproducing them in our pages. It has not been that we failed to appreciate the value of the literature presented by these worthy publications; it has not been that we hesitated to introduce them to our readers; it has not been because these articles "have appeared in print before." It has been solely because we feel sure that they have each already been seen by some considerable portion of our subscribers. The same reasons do not obtain for excluding articles previously published in the various Dental Journals of England and the Continent, or in reproducing matter of scientific interest from the various domestic and foreign technical publications of the day, among which we may instance *Silliman's Journal*, *MacMillan's Magazine*, *Engineering*, *Van Nostrand's Eclectic Engineering Magazine*, the *American Chemist*, and that most excellent publication, the *Popular Science Monthly*.

PROSPECT.—From the above remarks, it will be plain that we design to offer to our readers:

1st. *Well selected original articles*, "fresh contributions from the experience of active practitioners of dentistry upon matters of every-day interest in each of the departments of operative and mechanical dentistry." (Prospectus, 1874.)

2d. Carefully selected matter from foreign scientific literature, and from Journals which are presumably in the hands of only a very few American dentists. We think such eclecticism must prove of the greatest value and interest to our readers. We do not therefore accept an article merely because written by a dentist, or reject one because it has appeared elsewhere. We prefer to furnish something from the pen of Prof. J. W. Draper, or Prof. T. H. Huxley, rather than to fill the space with unimportant reports of the meeting of some dental society, in which it is only told us that Drs. A., B., C. and D. met, elected each other to office, made "highly interesting remarks" and adjourned. We think we may safely trust that our readers coincide with us in judg-

ment. Far be it from us, however, to decry fair and full reports of the meetings of our dental societies. When the reporter tells us *what* the members said, their agreements or disagreements as to methods of practice, or gives to us a record of their experiments, nothing more valuable can be introduced, if the meeting be one of interest, and participated in by men of intellect and experience.

3d. Of *such* reports we have not had a sufficient number during the past year. We shall aim to have more during the year now opening.

4th. We shall continue to secure for our readers, articles from masters on their specialties, as those from the pen of Dr. N. W. Kingsley, which we have published during 1874.

5th. We are convinced that additional interest can be added to the MISCELLANY by increasing the space devoted to Notes. These shall be short, interesting paragraphs of news and invention, gleaned from the scientific periodicals of the day.

6th. We shall aim to illustrate the MISCELLANY with well-executed cuts, as we have done hitherto, constantly increasing the number and finish of the illustrations as our list of readers increases.

The publishers offer to subscribers for 1875, a choice of premiums, either of which could not singly be produced for one hundred dollars. For premiums and terms see fourth page of the cover.

HARVARD UNIVERSITY DENTAL SCHOOL.

We have just been shown a private letter, announcing that the Faculty of the Harvard Dental School, at a meeting held Dec. 23, 1874, resolved that the unanimous expression of the opinion of the dental members was, that "from and after September, 1876, the Harvard Dental School will increase its courses from four to eight months, and divide the School into two classes, so that the teaching of one course shall not be repeated in the next." This, it will be seen, makes it necessary for each student to attend two courses of eight months each, if he wishes to get the whole benefit of the School.

Of course the Faculty expect a great diminution in the size of the classes, and a corresponding diminution in revenue, but we are glad that they have been able to recognize the "signs of the times," and to continue to take the lead in the advancement of the standard of education.—ED.

NOTES.

"The Tooth Drawer" is copied from an old English steel engraving. *Dental pictures* are not numerous, and we have taken considerable pains to reproduce a few for our readers, to whom we hope they may be acceptable. For use of the originals of the two just published, we are indebted to the kindness of Drs. A. L. Northrop and H. S. Baylis, of this city. We shall prepare a few copies of this engraving, and of that in our December issue, on fine plate paper, and of suitable size for framing.—ED.

Irregularities.

With the February issue, Dr. N. W. Kingsley will resume his articles on "Irregularities." These are fully illustrated by accurately executed plates, and each one of them will profit the attentive practitioner many fold the cost of his years' subscription.—ED.

Look Out for Him.

THE MAN WHO WANTS A SET OF TEETH FOR A CHRISTMAS PRESENT.

A few days ago a respectably-dressed individual called on a prominent dentist, who has his office on Fifth Avenue, and inquired of him what would be the cost of a complete set of teeth made in the best style. "I have been recommended to you, Doctor," he added, confidentially, "by my friend, Tiffany. I am told you make the best teeth in New York." The Doctor stated the probable cost of the article. "Ah," said the stranger, "very good. Now I want this set as a Christmas present for a lady." This seemed an odd sort of taste, but it takes all sorts of people to make a world, and the Doctor thought no guile. "You understand, Doctor," said the stranger, "I don't want her to know the cost; can you arrange it —or stay, by the way—if you can tell me the exact price, I'll pay you now." Here the stranger took out his pocket-book. The guileless Doctor fell into the trap. He mentioned a price, received a check for a much larger sum, gave his own check for the balance, and the stranger left with many expressions of satisfaction. It is needless to add that his check was bogus. It purported to be drawn by Tatham Brothers to the order of Edward A. Phelps, on the Fulton National Bank. Mr. Edward A. Phelps is a middle-aged looking individual, with side-whiskers slightly streaked with gray, of average height, rather well built, well dressed, and very plausible in manner. He is evidently an old hand at the business, though the trick he played was so transparent that his mortified victim could not help exclaiming: "To think that I should have lived all these years and been deceived by so old a game as that."

HERE HE IS AGAIN.

Early yesterday forenoon a gentlemanly appearing stranger entered Dr——'s office at No. — Clinton street, Brooklyn, and said he wanted to get a full set of teeth for his wife as a Christmas present. He wished, he informed the dentist, to pay for them in advance. The lady was not to know of the matter until she called for the teeth, and was handed by the dentist a receipt in full. Dr. —— said his price for a full set of teeth would be $150. The stranger, who gave his name as Anson G. Clarke, readily agreed to pay that sum, and producing two checks, one for $125

and the other for $100, asked for the change. Dr. —— at once gave his check for $75 to the customer. Some time after Mr. Clarke left the office, Dr. —— became uneasy about the checks, and to satisfy himself paid a hasty visit to the bank. There he learned that his own check had been cashed, and that the checks given him by the stranger were worthless. The police are looking for Mr. Clarke.—*N. Y Times.*

Syracuse, N. Y., Dec. 14, 1874.

JOHNSTONS' DENTAL MISCELLANY.

At the Union Semi-Annual Meeting of the Fifth and Sixth District Dental Societies of the State of New York, held in Syracuse, November 24 and 25, 1874, Dr. J. C. House read a paper giving a history of the life and professional services of Dr. H. A. Coe, concluding with the following preamble and resolutions, which were unanimously adopted :

Whereas, In the high and ever-ruling wisdom of God, it has seemed good for Him to take from us our esteemed and respected colaborer, Dr. Horace A. Coe, late of Theresa, Jefferson County, N. Y., by death, which sad event occurred January 2d, 1874, at Augusta, Ga. ; therefore be it

Resolved, That in the death of Dr. Coe, society at large has lost a man of unblemished character, his family a husband and father at once beloved and loving, the Church a member of valued usefulness and sterling worth, and this Society a colaborer whose counsels were ever respected, whose reputation was an honor to our profession, and whose absence from the sittings of our meetings, as brother members we shall long recognize as an irreparable loss to our society.

Resolved, That we extend to the family of our deceased brother member, that sympathy and heart condolence in their affliction and bereavement, which, in this formal manner, it is so hard to give suitable expression to in language, and yet, which it is our earnest desire to place upon record as a slight token of the high esteem and regard in which the deceased was held by the members of this Society.

Resolved, That copies of these resolutions be sent to the family of Dr. Coe, and to the Buffalo *Dental Advertiser* and JOHNSTONS' DENTAL MISCELLANY, for publication, and that a page of the records of our society be assigned, upon which the same shall be separately engrossed.

Please give publication in your Journal, as per request. The Doctor was a member of the Fifth District Dental Society. Respectfully Yours,

F. D. NELLIS,

Secretary Fifth Dist. Dental Society.

Chlorine Gas in a New Relation.

During the late cholera epidemic in Vienna, a new remedy, called camphorein, was used with great success in the hospitals. It is prepared simply by passing chlorine gas into pure turpentine oil until saturated ; it gives a thick, heavy, oily fluid, of brown color, with a strong smell of chlorine. This is freed from muriatic acid by washing with water. The remedy is applied by placing a portion in a flat vessel and holding it to the patient to inhale. The results attending this method of treatment are regarded as indicating that oil of turpentine is the best absorbent of chlorine gas, and that, therefore, it can be employed with advantage in operations and other cases where chlorine is to be evaporated in large quantities.

JOHNSTONS'

Dental Miscellany.

Vol. II.——*FEBRUARY*, *1875*.——No. 14.

CASES OF IRREGULARITY.

By Norman W. Kingsley.

Sometime since my attention was called to the mouth of a child nine years of age, whose teeth were erupting and growing unlike other members of her family.

The father and mother both had regular dentures. The mother in

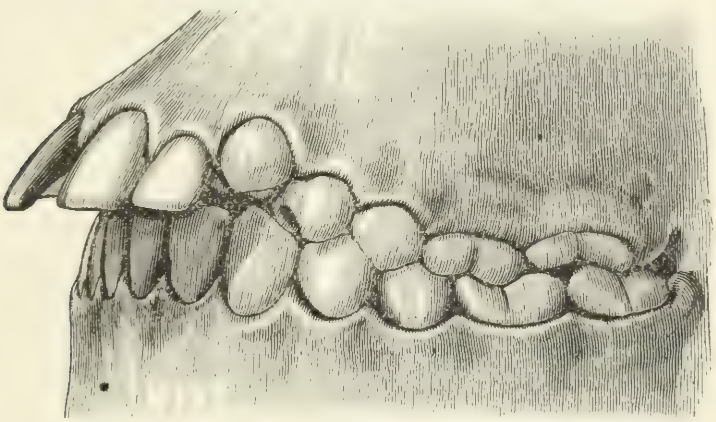

Fig. 1.

particular had a most intelligent face, with regular handsome features, and large beautiful teeth. An older sister had fully developed teeth in both jaws, all regular, and of the type of the mother. In the child, the incisors were protruding, and the whole upper jaw gave the appearance of being excessively large. (See fig. 1.) The teeth of the lower

jaw were normal. I could see no reason for this peculiarity. It was not inherited from either father or mother, nor from the grandmother, whom I also saw, nor did they know of a like deformity in any of the relatives. It was not the result of thumb-sucking, nor, so far as I could learn, of any other evil habit.

I did nothing at the time, thinking it possible that the action of the upper lip might have a tendency to depress them as they advanced. I watched the case for four years before I decided to act. During this time they had continued to grow worse, and were throwing out the upper lip so that it was with much difficulty that the lips could be brought together, and the mouth closed. The surrounding features were developing after the symmetry of the mother's. The permanent

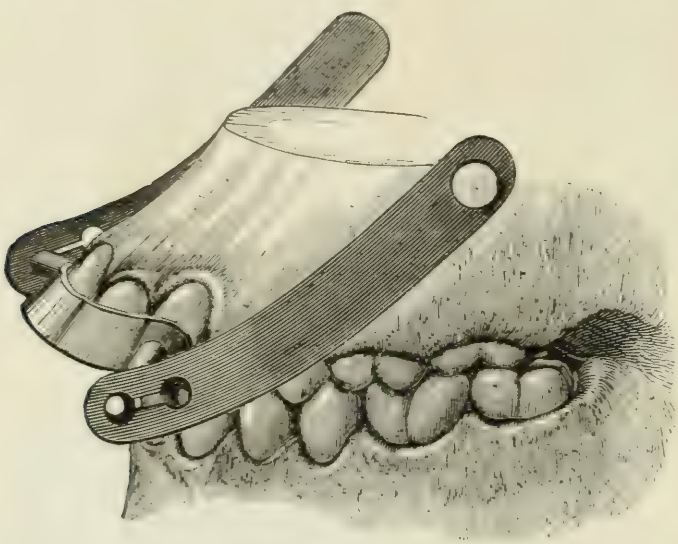

FIG. 2.

teeth of that age, (13) had all made their appearance, and the mouth was deformed without hope of improvement in the course of nature.

The teeth behind the canines were all in contact and articulated well with those of the lower jaw, but the incisors were spread and straggled, and the crowns had the appearance of being of extraordinary length.

As interference need be no longer postponed, I made a frame of gold, covering the cutting edges of the incisors, and lapping on to the canines, and a plate of vulcanite adapted to the roof of the mouth, such as described in former articles, and cut away in front to provide for the retrocession of those teeth. Ligatures cut from rubber tubing were attached to the posterior part of the vulcanite plate, one on each side, and drawn forward and caught on projecting spurs of the gold

frame. This apparatus, which can be easily understood from the description, was worn for a short time, when two discoveries were made. First, the arch in front was by this means contracted, until the teeth came in contact, but was not sufficiently reduced. With the teeth all now in close contact, there was no hope of further reduction without the removal of a tooth, and the first bicuspid on each side was consequently extracted. Secondly, the backward movement showed an apparent elongation of the incisors. I do not think it was an actual elongation, but an appearance arising from crowns of an already extraordinary length becoming more perceptible as they came into a vertical line.

Fig. 3.

It became evident that any further pressure in the same direction would eventually carry the teeth down so as to touch the gum of the lower jaw, thus completely hiding the lower incisors and producing a deformity but little preferable to the first.

In this emergency I conceived the attempt to shorten the crowns of the upper teeth by driving them up into the jaw.

I continued the apparatus as before described within the mouth, and added to the gold frame a stud or post about half an inch in length, soldered to it opposite the canines, and coming out of each corner of the mouth. This apparatus, when in position, is shown in fig. 2. The arms extending upward, passing outside the cheeks, were made

of strips of brass, and were connected by elastic ligatures with a skull-cap as shown in fig 3.

This skull cap was made of leather, and the whole apparatus was very easily applied as follows :

The vulcanite plate was inserted in the mouth, and the rubber ligatures brought forward and caught as before described, the skull cap placed on the head, and strong elastic straps were caught over buttons or hooks on the cap, and like buttons or hooks on the cheek arms. The action will be understood by observing fig. 3. The outside pressure was forcing the teeth up into the jaw, while the pressure inside was carrying them in a direct line backward.

This apparatus did not interfere with the comfort of the patient in any respect other than the appearance, and was worn constantly for a period of three months ; after that, during the night, and somewhat during the day, for an additional two months. The result was the six front teeth were carried back so that the canines came in contact with the second bicuspids, and the incisors were driven up into their sockets one-fourth of the length of their crowns, and the family expression of the mouth and face restored. The result is shown in fig. 4.

So far as I am aware, this was the first effort ever made to shorten teeth by retreating them within the jaw where they had become elongated through natural or developmental causes. This occurred in 1866, and was reported at the May Meeting in that year of the New York Dental Society, and published in the "*Dental Cosmos.*"

The success in this case involved absorption of the walls of the socket, and is not to be confounded with some cases which I have seen since reported, where a tooth had become elongated by accident, as, for instance, the presence of a rubber ring around the neck of the tooth, and pressure was resorted to, to restore it.

In the latter case it is probable that neither deposition nor absorption of bone took place.

My attention was recently called to an instance in Dr. Thayer's practice, in Brooklyn, where the pathological condition was like my own case.

In arranging several of the teeth of the upper jaw for a patient, he had occasion to turn one of the central incisors. After the teeth were all brought into line he made a retaining plate with a band in front. The patient neglected to report herself, and went out of town, being gone for several weeks ; during which time the bearing upon the aforementioned incisor became such as to drive it up into the jaw, and when

discovered by Dr. Thayer, was shorter by one half the length of the crown than its adjacent neighbors.

Fidelity to history requires that I should report the disastrous results that followed neglect and inattention to my instructions in the case here described, and illustrated.

Immediately on obtaining the desired results in appearance, I made and applied a retaining plate, which, if worn, would keep the teeth in their newly acquired positions. Being over-persuaded, I foolishly gave my consent to an immediate trip to Europe, the patient to return to me in four months. My parting instructions being that the retaining

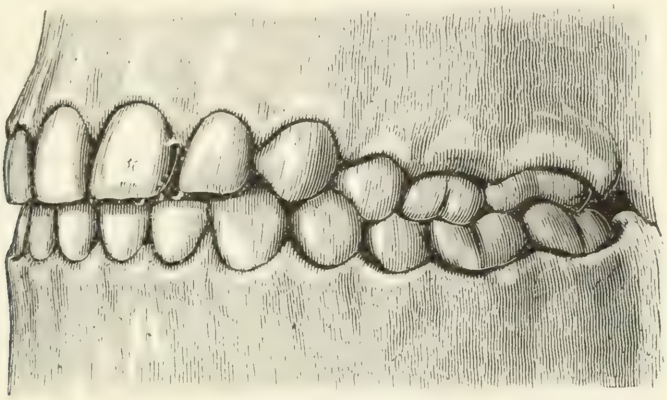

FIG. 4.

plate must be worn constantly. On board ship the plate was removed during sea-sickness, and no attempt made to replace it, until they arrived on the other side the Atlantic, when it was found that it could not be inserted, the teeth having changed position. A number of weeks elapsed before any one was consulted, and in the meantime they had gone all astray.

A year and a half afterward, the patient returned to this country, and reported herself to me. The teeth were then, if anything, more disorderly than before I made any attempt with them, and I declined to farther interfere, partly from discouragement, and partly from a doubt as to the expediency of breaking up the structures a second time, and at this more advanced age.

And the last condition of that patient was worse than the first. The moral is evident.

Mrs. Bartlett's statue of Dr. Wells, the discoverer of anæsthesia, is to be cast in bronze, in one piece, and set up at Hartford, just as it comes from the mint.—*New York Medical Record.*

SPECIAL MEETING OF THE NEW YORK ODONTOLOGICAL SOCIETY.

The New York Odontological Society held a meeting lately somewhat different from their usual evening meetings, and as their proceedings are to be published in book form, we are unable as yet to give more than an outline of what was done and said.

The Committee left all routine business out, and prepared a programme which was sent to their guests three or four weeks in advance. Papers and discussions on purely professional and scientific matters fully occupied every available hour of the days of meeting. The following was the programme :

MONDAY, DEC. 14.

Evening, 8 o'clock, No. 8 East 34th Street, Dr. Bronson's.

Incidents in Practice.

Dr. Bonwill's Inventions—The Electro-Magnetic Mallet—Rubber Disks and Dental Engine.

Dr. Jack's Electro-Magnetic Mallet.

Dr. Thompson's Head Rest.

Exhibition of other New Appliances.

TUESDAY, DEC. 15.

In the Parlors of the Presbyterian Church, (Dr. Crosby's), cor. of 4th Ave. and 22d Street.

Morning, 9 o'clock.—Materials for filling Teeth—Papers on Amalgams, by Dr. Cutler, the late Prof. Thos. B. Hitchcock, and Dr. Bogue, embodying the results of the Latest Investigations.

On Gold, by Dr. Black.

Afternoon.—Dr. N. W. Kingsley, on the Causes of Irregularity in the Development of the Teeth.

Evening, No. 34 West 28th St., Dr. Lord's.

Dental Education—Papers by Dr. Garretson, Dr. Truman, and Dr. Chandler.

WEDNESDAY, DEC. 16.

In the Church Parlors. Morning, 9 o'clock.

A paper by Dr. Moffatt, on Dental Eclecticism ; and by Dr. Cushing, on What Patients have a right to Expect at the Hands of Dentists. Also a paper by J. Smith Turner, M.R.C.S., of London, England, on a New Method of taking Plaster Impressions.

The Committee invited guests to the number of two hundred or more, and about one hundred and fifty responded. Thus, a selected number came together, prepared to make the most of the occasion.

The first evening was spent at Dr. W. A. Bronson's, where a number of new appliances were exhibited, including two forms of the electro-magnetic mallet, three forms of burring engine, a number of head rests, rubber disks for separating teeth, office lathes, etc.

The President delivered a short welcoming address, and spoke feelingly of the death of two of the invited guests, who were expected to have been with the body—Drs. Eleazer Parmly and Asa Hill, both well known members of the profession. A committee was appointed to draft suitable resolutions, and then Drs. Bonwill and Jack, of Philadelphia, each read a paper on the electric mallet, and gave in a condensed form (besides some quite original ideas) many facts that to obtain elsewhere would necessitate wide research. The rest of the evening was spent in promoting acquaintance among those assembled, and discussing the supper most liberally provided by the host.

Next morning the Society and guests met in the parlors of Dr. Crosby's church, and three papers were read on the subject of amalgams used for dental purposes.

The first was by Dr. Cutler, of Memphis, and detailed at length, the results of experiments that he had made on almost every metal that could be supposed to unite with mercury, to ascertain what proportions are necessary to make the best practicable alloy. The essayist did not differ materially from the conclusions that he reached in previous experiments, from reports of which we make a few extracts.

"All good amalgams must be composed of at least two metals besides mercury. . . . . ."

"The metals most suitable for amalgams are reduced down to three: silver, gold and tin, mercury forming the amalgamating metal. Tin and silver make the best, silver and gold answer very well. Gold and tin (form an alloy) too brittle and hard for practical purposes; it does not harden at all when amalgamated; none of the other metals will answer, as they would not stand in the mouth."

"Undoubtedly I think amalgam may not only be used, but with most decided benefit in a great many instances; where gold cannot be used I would use amalgam for permanent use. I have used amalgam for twenty-five years quite extensively, and never in any instance have I seen a single well-marked case of disease, either local or general, from its use in my own hands, or in any others. I have

seen cases that have been attributed to its use, but without satisfactory evidence. I believe that good amalgam fillings in *badly decayd teeth*, thoroughly introduced and well finished after hardening, are superior to any other filling, and that they will preserve such teeth much longer than gold or anything else, especially in back teeth. There are various well-founded reasons for these conclusions."

In relation to amalgam and its rank as a filling, he unhesitatingly places it next to gold for permanent use.

He has noticed great carelessness in the use of amalgams, and many good operators are quite ignorant of the proper method of using it.

The next paper was by the late Prof. T. B. Hitchcock, of Harvard Dental School, and was read by the present Dean of the School, Prof. Thos. H. Chandler, of Boston.

This paper went most carefully over the subject of the adaptability of amalgams to dental use, including the question of comparative shrinkage or change of form, their permeability to colored fluids, their adaptation to the walls of the cavity, their composition, mode of working, &c. This paper gave the analysis of nine or ten of the best known amalgam fillings.

A great deal of difference was found in the different specimens as regards their adaptability to a cavity, their shrinkage and change of form. Two cases fifteen inches long, of glass tubes that were handed around, showed the penetration of ink around the whole filling in some cases, only around the margins in others, and none at all in a few.

The third paper on amalgams was by Dr. E. A. Bogue, of New York, relating the results of some very extensive experiments made during the past three or four months, in the chemical, physical and physiological effects of these materials as used for filllng teeth. designed to answer the question frequently asked, "Are the amalgams used by dentists injurious to health?" He found that mercury was not given off from the amalgams in ordinary use. The experiments he had made were so severe as to nearly dissolve the teeth subjected to them, but in no single instance was mercury fonnd. He had taken the solutions to Professor Chandler, of Columbia College, for analysis, and the Professor agreed with him that no mercury was discernible.

At 2.30 the meeting was again called to order, and the paper by Dr. Black, of Jacksonville, Ill., on Gold, was read. It was very interesting, eliciting discussion. In substance it is very much like Dr. B.'s essay on the same subject, published on page 283, July number of *Missouri Journal* for 1869.

After a limited discussion of this paper, which was pronounced by some, the best that had ever been written on the subject, Dr. N. W. Kingsley's paper on the "Causes of Irregularity in the Development of the Teeth" was next read, including some remarks upon the correlation of mental and dental development, or the question whether the position of the teeth and the shape of the jaws could be relied upon as a diagnostic symptom in idiocy. His opinions were based on investigations made in this country and in Europe, and the subjects were persons of all nationalities, sane and insane, and of all classes of society. The conclusions he had arrived at were that irregularities of the teeth were a symptom or a proof of a cerebral or brain disturbance which had occurred at some period of the early life of the individual, or of a like disordered mental condition at some period in the history of the patient's ancestry, and that the inevitable tendency of such a condition, if transmitted, would be mental degeneracy, imbecility, and idiocy.

In recognizing an antagonism, I cannot but be impressed with a similar contest going on more or less frequently between the mental and physical development—between the brain and the body. In the normal state of man those two systems are found working in harmony. In the present refined or degenerative state, it is fighting for supremacy, with the odds in favor of the brain. No one of extended observation will hesitate in believing that there is a faculty or power at work, modifying materially the physique of the present generation, altogether inexplicable by the too commonly asserted influencing power of climate, hygiene, or diet. Laying aside all cases that may be due to an inherited tendency to follow or exaggerate some given type, together with those which are manifestly due to forces operating only after eruption, the primary cause, so far as the individual is concerned, of any general disturbance in the development of the permanent teeth, showing itself particularly in their malposition, is directly traceable to a lesion or innervation of the trigennial nerve ; that it is an interference more or less prolonged with one of the prominent functions of that nerve, and operating at its origin. If a precocious or stimulated brain in infancy urges on and crowds the dental organs in advance of the growth of the jaws, then a brain of larger calibre or power would be likely to have associated with it a retarded dentition, but with abundance of room.

I examined the mouths of two hundred inmates of the Asylum for Idiots on Randall's Island, and I did not find a single pronounced case of a V shaped dental arch. There were very few cases of narrowed palatine arch, only three or four of saddle shaped palates, that is, of a

palate approximated in the bicuspid region. There was very little irregularity in the position of the teeth, very few teeth were out of line, whatever that line was; and the malformations were generally confined to the six front teeth. There was no more irregularity, decay, loss of teeth or neglect than would be found among the same number of youths taken at random from the streets. Recently, while spending a few weeks in Switzerland, I devoted some time to the examination of the dental condition of the Cretans, and in the asylums and hospitals in Paris I examined the mouths of a large number of idiots, and the results were in no way dissimilar to what I found on Randall's Island. I visited one asylum in London, and there found a larger number of V shaped arches than I had seen in other institutions, perhaps about five per cent., but I did not see one so pronounced a case as I have treated in my private practice, the patient having a full intellectual development. The fact of seeing so much larger number of deformities when visiting the asylums in *London*, was less puzzling after I had learned the fact that nearly all the cases that I had seen were offspring of the nobility. No irregularity in the position of the dental organs is any evidence of idiocy in the individual. Irregularities of the teeth in childhood indicate more likely a precocity of mental development, and possibly a more brilliant intellect in the adult. It does prove a disturbed cerebral condition at some period of the child's history, or, if resulting from hereditary taint, shows such a condition in the progenitors, which had originated from like causes, and unless checked will become intensified by transmission under similar surrounding conditions, and the future history of that family will be mental degeneracy.

At the evening session three papers were read on the subject of Dental Education. The first paper, Dr. Truman's, of Philadelphia, was altogether in favor of having dentistry an independent profession, without any alliance with the medical profession. The Doctor was very severe on the quacks, and wanted to have a thorough test established before any candidate could become a dentist. He regretted that the standard of mental culture was so low in the profession; but instead of pursuing a selfish course, they should educate, and in time to come the lethargy of the past would be thrown aside. Dr. Garretson, of Philadelphia, addressed the meeting next, saying that dentists ought to drop their distinctive title, and consider themselves specialists in medicine.

He thought that for dentistry there should be a qualification in med-

icine, and that the medical diploma having been obtained, that there should be a special study made of dentistry. If the dentist was unwilling to do this, he (the speaker), believed that the title of doctor ought to be dropped, and the recusant should consider himself to be a mechanic. The next speaker was Dr. Chandler, Dean of the Harvard Dental School, who thought that the field of dentistry was sufficiently large to occupy any man who chose to engage in the work, but he believed in qualifying the student in every branch of medicine that bore directly on the special branch of dentistry. The dentist should be proficient in anatomy, special surgery, physiology, and chemistry, but beyond this he did not think that the time spent in the study of general medicine would be spent to the most advantage.

The Society resumed its session of the special meeting Wednesday morning in the parlors of the Rev. Dr. Crosby's Church, at Fourth Avenue and Twenty-Second Street. Dr. A. H. Northrop, President of the Society, occupied the chair, and Dr. Dunning spoke on the subject of Dental Education. The Secretary, Dr. Jarvie, then read a paper prepared by Dr. Cushing, on "What patients have a right to expect at the hands of dentists?" A very lively discussion, led by Dr. Atkinson, arose on this paper; all, however, agreeing upon the point that patients had the right to expect the very best treatment and the best display of talent that could be exhibited. Prof. Moffatt, of Boston, then read a paper prepared by himself, on "Dental Eclecticism." This paper excited a long discussion, in which Dr. Rich, Dr. J. S. Latimer, and Dr. Clowes, of this city; Dr. Batchelor, of Salem; Dr. Wheeler, Dr. Dunning, Dr. Sheffield, Dr. Francis, Dr. Kingsley, Dr. Butler, of Cleveland, Dr. Bogue, Dr. Atkinson, Dr. Seabury, of Providence, Dr. Searle of Springfield, and others, took part. A paper by Dr. J. Smith Turner, member of the Royal College of Surgeons of London, England, was next read by the Secretary, and was found to be a treatise on the "New Method of taking Plaster Impressions of Jaws, Teeth, &c." This paper excited little discussion. Dr. Butler then introduced an appliance to be used for inserting retaining screws in the teeth. After explaining the process, one of the members asked if the appliance was for sale, and was answered that it was not, but that the explanation of the principle was given for the benefit of the Society.

The morning session was prolonged into the afternoon, for the purpose of completing the business, and at the close the Society adjourned, but agreed by resolution to meet at the residence of the late Dr. Eleaser

Parmly, the oldest member of the profession, who died suddenly on Sunday last, and whose funeral the members attended in a body.

Among the many appreciative letters received since the adjournmen of the Special Meeting, we have room for only the two following:

"Now that the most happy congregation which has ever been hel ! of dentists in this country is over, may I be permitted to congratula the Odontological Society on such a notable success? I do not forge the most remarkable papers of this Special Meeting, and I think large fruit will grow out of youı late effort. — — — ."

"I wish to acknowledge my appreciation of the recent glorious meeting in your city, of the most eminent men in the profession on this continent. Attendance upon that meeting was to me a rich treat. I enjoyed the session very much, and I have been greatly profited by the papers and discussions which I there heard. — — — ."

FALLIBILITIES OF SCIENTIFIC EVIDENCE IN MEDICAL JURISPRUDENCE.

By A. C. Castle, M.D., New York.

(*Continued.*)

Madame Lafarge was placed on trial. She was defended by the eminent counsel, M. Paillet. In her defense he produced and read a letter from *Orfila*, the highest accepted authority in the science of Toxicology, saying, "You ask me if it is sufficient proof of the presence of arsenic in the digestive organs, if the liquor produced by boiling them in distilled water yields, when treated with sulphurated hydrogen, a yellow precipitate? I answer, no; the precipitate itself must be analyzed, and metallic arsenic found therein." Orfila then refers to a case where Barruel and himself, examining a yellow precipitate supposed to be conclusive proof of arsenical poisoning, they found that it contained *only some animal matter* naturally present in the bile. This letter of Orfila completely destroyed the case for the prosecution, the experts only having tried this one test. The court then selected Monsieur M. Dubois and his son and M. Duputren to make other analyses. They gave evidence that they had experimented with the most recent approved methods, including "Marsh's process," considered the most subtle and certain of tests, *and not a trace of arsenic could be detected.* The prosecution, not yet satisfied, caused the body to be exhumed and the chemical analysis to be renewed. The remains were found in a

state of hideous paste-like decomposition. The body had been in the ground over seven months. It is an accepted proposition that arsenic preserves the body from decay. The paste-like remains were *carried into the court-room,* and the chemists, in public, before the court, performed their disgusting task. The chemists appointed consisted of the most exalted men of the day: *Orfila Devergie* and *Chevallier.* In the absence of the two, Orfila selected Monsieur De Bussey, his assistant, and Monsieur Ollivier, the latter a doctor, and not an expert chemist; so that in fact Orfila was alone. The experiments completed, Orfila addressed the court: "I shall divide what I have to say into four heads. First, I shall show that there is metallic arsenic in the body of M. Lafarge; second, that this arsenic does not come from the reagents we have used, nor from the earth in which the body has been interred; third, that it is not the arsenic *normally* (*!*) present in the human frame; and fourth, that it is not impossible to explain the inconsistencies in the evidence of the other experts." Notwithstanding that only a week previous, the very chemical science that had pronounced her innocent, now declared her guilty, the jury convicted her; "with extenuating circumstances," however. She was sentenced to hard labor for life.

Two years later Madame Lacoste was tried for a similar offense. The case of Madame Lafarge was viewed as the precedent upon which to establish the guilt of the woman. M. Chevallier, one of the eminent chemists who had been chosen to assist Orfila on the Lafarge trial, was being examined, when a juryman asked him this question: "Was the quantity of arsenic found by you in the body of Lacoste equal to that which served as a ground for conviction in the Lafarge case?" The great chemist paused for a time, as if to weigh well his words, and then answered: "I cannot reply to a question so put; *what was said to be the poison* found in the body of Lafarge was *imponderable*; it was so infinitesimal that it could not fulfill the conditions of a standard of comparisons, when we use the words 'more' or 'less'." So shocked were the jury at discovering upon what a slender thread of scientific evidence Madame Lafarge had been convicted, that they promptly acquitted Madame Lacoste, although the other facts in her case presented the strongest evidence of guilt.

Our views upon poison tests were strengthened by the case of Madame Lafarge, which, as we have said, were published in the New York *Herald,* from which they were re-published in *Galignani's Messenger,* Paris. They attracted the attention of Orfila, who noted our

objections. As a man of science and a man of truth, he examined his tests used in the case of M. Lafarge, and discovered that they were impure. His report to this effect secured a pardon for Madame Lafarge.

Some time after the trial of Madame Lacoste, a pamphlet appeared, giving the clue to the extraordinary answer of M. Chevallier to the juryman on her trial. The gist of Marsh's process for the detection of arsenic is this: Having by the use of certain reagents procured arsenuretted hydrogen gas, which burns with a pale bluish-white flame, and a thick white smoke, slips of glass or porcelain—porcelain plates are generally used—are held over this flame, and metallic arsenic is deposited thereon. In the Lafarge case the gas was produced three times; in the two first instances the potash and zinc used were purchased from drug stores in the neighborhood, and the deposit of arsenic upon the plates was so slight that it was described as "merely a breath." On the third plate it was more marked, but the potash and zinc used in that case had been bought in Paris, by M. Orfila's assistant, and the remarkable statement is added, that although they were not worth fifty centimes, he, Orfila, was very careful at the conclusion of the experiments at Tulle, in gathering every scrap of these reagents, and carrying them back to Paris with him. Nor were they ever subjected to a separate analysis to ascertain their own freedom from the presence of arsenic, as was done with the potash, &c., purchased at Tulle. This omission of Orfila, as we have shown above, must have been an error, because Orfila's representation of the impurity of his tests, ultimately secured Madame Lafarge's pardon. Orfila in the first instance was under the impression that his tests were brought from his own laboratory, and therefore did not deem their further examination necessary. The extraordinary circumstances attending the production of the deposit on the third plate should have caused its rejection as evidence, and the only proof then remaining of Lafarge having died of poison was the "breath-like deposit" on the first and second plates, an amount "too small" said M. Chevallier, "to be expressed in figures."

We have been told, (and the world is so impressed): "Most frequently the chemist has no other directions than to search for poisons without any hints, or having his attention called to any one particular poison." This we deny. It is not true. The hint to the coroner and to the chemist has always presented itself in the shape of bottles and the remaining contents within them, or from papers picked up, near the supposed poisoned body, with the few remaining particles adhering,

and their respective labels; and from the evidence of druggists selling poisons to suspected persons. For the truth of this statement, see the records of poison cases tried within the last seventy years in England, the United States, France, Germany, &c. We ask "*Who has ever heard of, or where is there an instance on record of a chemist,* in criminal poison trials, *ever finding any other poison than the one for which the evidence directed him to search for?* And this, too, directly in the face of the knowledge that numerous poisons are daily taken into the system, by means of adulterated food, poisoned wines, liquors, spirits, beer, lager beer, etc., tobacco, opium, to say nothing of the chemical combinations constantly forming and reforming in the digestive organs. No. Either a suspected "trace," "a breath-like deposit," of the suspected poison, sought for, has been found, or *none whatever*, not even the remotest hint of an *infinitesimal trace* of any other poison being present or suspected. This is more to be remarked because M. Walcheren, one of the directors of the mines in the Grand Duchy of Baden, shows the universal presence of arsenic in chalybeate waters and ferruginous earths, in clays and cultivated soils, &c. He says: "*It is manifest they may occur under circumstances when the presence would not be suspected, and may affect the chemical tests employed in medical jurisprudence, and thus bring innocent persons under suspicion.*"

Is it not strange, after M. Walcheren's statement, that of the many analyses which have been made and paid for, of the numerous chalybeate waters, that the only chemical constituents ever discovered held in solution, have been those elements which the interested owners of the "springs" think will pay best, and which the imagination of the dyspeptic, the rich, the lazy, the nervous, the hypochondriac, and the *blasé* order of society is impressed will renew the blood, their youth and freshness to the required pristine vigor. Singular it will appear to the non-chemical reader to know that the analysis of the *Croton water* supplying the million of people, contains the same elementary constituents as are contained, by analysis, in the majority of the Saratoga and other waters, of course in a less degree and in a drinkable form. Here we have a natural chalybeate spring in every house, at every street corner, only that the water contains too much filthy organized matter, often unfit to drink. Chemical experts never find, by any chance, what M. Walcheren states—the presence of arsenic—as a fact. Now, arsenic is one of the best of tonics. It will often cure fevers, and "blood diseases," where quinine and other "alteratives" fail. But arsenic! in "waters" would frighten people, whilst poisonous gases present their recommendation.

M. Deschamps, in a paper sent to the Academy of Sciences, Paris, maintains that *copper* exists normally in human blood. The process he used is similar to the process he used in extracting copper from vegetables. The author states he has no doubt that this *physiological copper must be taken into account in all medico-legal investigations.* A former paper from this gentleman shows that vegetable substances obtain their copper from the soil, that herb-eating animals derive it from plants upon which they feed, and that man, who feeds on both, gets the copper into his system by that method. The London *Lancet* says: "It would be worth the while—is it not imperative for some of our able chemists either to confirm or refute this assertion? It will be remembered that *arsenic* also is said to have been detected as a constituent part of the body. It is of high legal importance that this should be determined."

The trial of John Stauff, at Darmstadt, for the murder of the Countess of Gorlitz, shows that the only evidence inconclusive and deficient was the scientific evidence given by the Baron Liebeg and another equally distinguished chemist, who, by their opposite opinions, demonstrated the fallibility of their science—the one insisting that diacetate of copper—verdigris—was harmless after it had been subjected to ebullition: while the other maintained with equal positiveness that the strength of the verdigris poison was greatly increased and intensified by ebullition.

Many years ago a man was tried for murder. The poison used, as charged in the indictment, was *prussic acid.* The prosecution was learnedly managing the case to its triumphant end, having all its own way, and so the trial progressed until nearly the last minute, when the Judge was addressing the jury adversely to the prisoner. Christison, the great toxicologist, was engaged for the defense: he was not yet arrived, in consequence of adverse winds detaining him on the passage from Liverpool to Dublin—this was before "steam packets" plied between the two cities. At this critical moment Christison appeared in court. The Judge, as a matter of right and justice to the accused, where life was so fearfully jeopardized, reopened the case for the defense. After Christison had read the chemical evidence offered by the prosecution, he addressed the court. "My lord, may I respectfully request your lordship to empty a portion of the *saliva* contained in your mouth upon this plate." His lordship did as Christison requested.

Christison then proceeded to apply the same order of tests which had been used by the "Crown's Expert" for the detection of the suspected

prussic acid in the body, and to the amazement of the Judge, counsel and jury, demonstrated precisely the same results upon this saliva as the tests employed by the prosecution had produced in demonstrating the presence of prussic acid in the body of the deceased. The man was acquitted.

Here was a physiological phenomenon exhibited, that *hydrocyanic acid*, or something so near in chemical proportion or combination as to render it analogous to this poison in certain conditions, (one of which is mental exhaustion or nervous exhaustion) of the system, forms in the mucous secreted from the mucous membrane, the same as other acids are found in the mouth, which dissolve the teeth, and others again, such as lactic, oxalic, phosphoric, uric, lithic, forming the several stones in the bladder, and "tartar" on the teeth, etc.

Guy's Hospital Report says that a liquid may have the odor of prussic acid when chemical tests fail to detect the poison; while the Judge who tried Tawell for the murder of Sarah Hart (England), by the poison of prussic acid, in his charge to the jury, said that the smell of prussic acid was no proof of its presence, but the absence of its odor was no proof of the absence of the poison.

Dr. Lonsdale, toxicologist, says that the odor of prussic acid could not be perceived in the blood or in the cavities of the heart or abdominal viscera when life was prolonged fifteen minutes, although when death took place within a shorter time, the poison might be detected in the body eight or ten days after.

We are not aware that Medical Jurisprudence has ever been called upon to investigate poisoning by *hemlock*. Such may have been the case. Since the death of *Socrates*, 400 years, and the death of Phocion, 318 years before Christ, hemlock has been esteemed a "deadly poison." Toxicological science has so entertained it. The materia medica has always so represented it. Now Mr. Harley and other eminent English toxicologists say, "that hemlock is no poison at all;" "that the common hemlock is neither a poison, nor even a medical remedy;" that sixty grains of the tincture was administered to a young woman, with no perceptible effects, (a half grain of conium is represented by the materia medica as causing vertigo, and three grains of the leaves carefully increased is a medical dose), Mr. Harley himself, after having taken *twenty-four grains* of the pure juice of the leaves of hemlock, only experienced muscular numbness, which passed off within an hour. Dr. Robert Nelson, of Montreal, informs us that he has witnessed three deaths from the effects of drinking the tea of the

root of the common hemlock. The Pall Mall *Gazette* says, in reference to hemlock as a poison: The facts relating to Socrates and Phocion may reasonably be explained another way. Dictionaries have always translated the Greek "Konecion" and the Latin "Cicuta" by the word hemlock. Some change of classification has no doubt occurred; what the ancients called hemlock was perhaps the cicuta vivosa L, which in fact is a most poisonous plant. But what of the long general use of common hemlock in medical and surgical practice as a powerful narcotic!

In connection with the fallibilities attending poison analyses by poison tests, it is doubtful if evidence of greater palpable exaggeration and attenuation has ever been admitted in a court of justice than that science which affects to prove the identity of blood—male from female blood; of the human blood; youth from aged blood; and blood designating the lower and different genus and order of animals. Micrography, too, lends its aid to chemical science to demonstrate these identifications, regardless of individual idiosyncrasies and temperament in the human being, and regardless of the pathological and physiological condition of "impure blood," "blood poisons," "blood diseases," "impoverished blood," "anemic blood," "plethoric thick blood," etc., and whence, and under what circumstances, one or all of these peculiarities the blood was procured and examined.

In the case of Colt, for example, tried for the murder of Adams, the evidence of Chilton, the expert, in substance said: Some ten or twenty days after the murder had been committed, he scraped from the wall of the room in which Adams was killed, "some dark reddish spots," which, upon being analyzed, proved to be "*male human blood.*" In this case, the wall from which these dark reddish spots were *scraped* was nearly a newly plastered wall. The carbonate and sulphate of lime of which it was composed still retaining many, if not all of their original chemical properties. Part of this compound lime, greatly in excess of the spots, was scraped away with the "reddish spots," and of course these were well mixed in with the carbonate and sulphate elements of the lime composing the wall. Yet Chilton proved these "reddish spots" to be male human blood. There is not a fresco painter or decorator that would attempt to meddle with a new wall, well knowing that the caustic chemistry of the lime would destroy his paints and his colors. The merest tyro in chemical knowledge knows that lime is caustic and antacid in its properties, etc., and notwithstanding that these chemico-caustic properties had burnt the "reddish" spots, and

destroyed the chemical proportions, physical character, and physiological characteristics of blood, the expert swears that the spots were male human blood. This is the evidence for the prosecution. For the defense no questions were asked—indeed, none seemed to be thought of, none appeared to be necessary—to demonstrate the truth of the chemical analysis, as to what change the caustic lime had produced on the "spots," what were the chemical, microscopical and physical character of the spots when scraped off, and how the portion of wall was separated from them, and, when separated, washed and dissolved; how his tests enabled him to discriminate that the spots were globules or corpuscles of male from that of female blood? We have omitted to allude to atmospheric and other influences in the case. The same eminent expert, in the case of Robertson, tried in New Jersey for the murder of Suydam, gave in evidence that several days after the murder he scraped some spots of blood from *between* two *new pine boards.* These spots he stated were *male human blood.* But no evidence was offered and none was asked to demonstrate what effects the long time that had elapsed, evaporation, putrefaction, etc., had produced on this confined blood, and scraped away with the new pine shavings of the *new pine wood;* nor was there the remotest attempt made to demonstrate what change the powerful turpentine of the wood, the pyroligneous acid, the resin, the mucilaginous juices of the new wood into which the spots of blood were sunk and mixed had made, or what chemical changes had been produced, that he could separate all these, and call from his retorts his chemico-phantasm of male human blood, distinguishable from that of the female blood. Both men were guilty, but other than scientific evidence fixed the facts.

In the case of Bridget Durgan, tried for the murder of her mistress, (New Jersey), the wife of Dr. Coolies. One expert proved that the large spot of blood on Bridget's petticoat was not the catamenial fluid, but that it was *arterial* blood, because it was coagulated. This gentleman was correct. The opposing scientific evidence proved that he *knew it was* the *catamenial* fluid, that this fluid "*did*" coagulate; "that now the *notion* that the catamenial fluid did not coagulate had '*exploded;*' that it was the mucous secretions which prevented the coagulation of blood." Yet everybody is cognizant of the fact that the bleeding from mucous membranes—the nose, the stomach, the intestines, the bladder, etc., that the mucous does not prevent the blood coagulating; on the contrary, the blood always is discharged in a coagulated form unless it is a persistent direct bleeding stream, like a bleeding nose, bleeding womb, etc.

In the trial of Twitchell for the murder of his mother-in-law, (Philadelphia,) it was put in evidence that blood "*will*" and blood *will not* coagulate when the hemorrhage is produced by violence, and under certain temperatures of the atmosphere. Any surgeon or abbatoir expert could positively have decided the question from long practical experience.

In the case of Webster, tried in Boston for the murder of Parker, we have the additional scientific evidence of the ever faithful, never failing, never mistaken, all infallible *Microscope*—an instrument that exhibits "*fungi!*"—(like the music of the spheres floating in space;)—filling the atmosphere with their poisonous presence, and presenting "the *super* exciting cause of malignant *Asiatic Cholera.*" This instrument, on Webster's trial, was represented as being far *more* reliable than blood tests, whatever they are. We saw Professor Lardner exhibit his magnificent, powerful hydro-oxygen microscope; he demonstrated the circulation of the blood in the body of a mosquito. It may have been the circulation of the blood: Dr. Lardner said it was—as a matter of politeness we were bound to believe him; or, it may have been—from our point of view—the spasmodic contractions of the mosquito's body, caused by the intense concentrated stimulus of light from the hydro-oxygen apparatus, or, what is most probable, the insect's futile struggle to release itself from its unnatural position. We certainly should not condemn a man to death on Dr. Lardner's experiment only.

A few years ago, an illiterate man of the name of *Galan* professed to possess the faculty of distinguishing the various characters of blood by an exalted organization, and hence acute sensibility of the *olfactory nerves.* He had made, in his lifetime, one or two good guesses in support of his pretension. This faculty, in Galan, was accepted by the Academy of Medicine, which is a branch of the Academy of Sciences, Paris. Hence this man Galan was acknowledged as an expert by the courts of justice, or rather courts of law, as an aid to elucidating the science of Medical Jurisprudence.

The body of a very pretty girl—a domestic attached to a chateau in the vicinity of Paris—was found murdered—having been first *abused*—in the woodland, outside the garden belonging to the chateau. The gardener employed to take care of the grounds of the chateau, being a *young* man, offered sufficient reason, in the mind of the authorities, for bringing him under suspicion: he was at once arrested as being the ravisher and murderer of the girl. The only tangible evidence that could be brought to bear against his innocence was his youth, and a few dark stain spots on the lower part of the leggings of his blue cotton

overalls ; the other parts of his clothing were entirely free from any marks, and were in their proper condition. The youth accounted for the spots on his overalls, as he "supposed" were produced by the plants bruising against them, as he forced his way through them when watering and weeding the flower beds &c. Or the dew on the bruised plants, mixing with their juices, had stained the leggings ; or the soil may have bespattered them. This was his only defense ; the aid of *chemistry* was then called in ; it entirely failed to fix the character of the spots ; *micrography* was then called upon to elucidate what chemistry could not accomplish ; the microscopist failed to identify the spots as being spots of blood. He said, "*After blood is become dried, and water has been added to soften it,*" (it was predicated that the overalls had been washed, although no evidence was offered to sustain this presumption)—the globulin of the globules of blood *was destroyed*, and the red coloring matter, the *hæmatin of the blood, escaped*, thereby preventing its identification or character. As in the case of Madame Lafarge, the court was bound to have its victim ; in its dilemma, then, how to proceed to convict the young man, as its *dernier resort* the court sent for Galan, the human blood-hound. He at once took the scent, he produced a written statement of his olfactory investigation, to which he swore in court, in substance as follows: That the dark red spots on the leggings of the overalls, he had examined by the acute faculty of his olfactory sense of smelling, that the spots "*were the spots of human blood*"—"*the blood of a young female who had never been pregnant!*" That he distinguished the blood from male human blood, as he also distinguished it from the blood of old age and the blood of the brute creation ; upon the villainous evidence of this ignorant miscreant the youth was sent to the guillotine.

The natural philosophy taught in our public schools bearing upon this subject teaches, "That all animals possess an odor peculiar to each species ;" by adding sulphuric acid—oil of vitriol—to a sample of blood obtained from "*any unknown*" source, it gives out the odor of the animal from which it was obtained, enabling us to determine its origin. This is taught *ex cathedra*. Would the author trust to submitting himself to test the truth of his teaching, being supplied with blood from *unknown sources ?*

Dr. Thomas Price, Professor of Chemistry, Toland Medical College, furnishes the following communication, published in the *Pacific Medical and Surgical Journal.*

On the 21st January last (1868), the clothes of an Indian, who, it

was suspected, had murdered an old woman seventy years old, at Martinez, Contra Costa County, were brought before me, in order that I might subject the blood stains to a chemical and microscopical examination. The evidence against the prisoner was entirely circumstantial, and created great interest during the trial. The Honorable J. Dwinelle, the presiding Judge, remarked that he never sat upon such an interesting case. The evidence, although entirely circumstantial, was overwhelming, and the able and indefatigable prosecuting attorney, H. Mills, remarked, "formed a complete and perfect chain without a link missing." When the Indian was examined at first, and before being committed to jail, he accounted for the blood stains being fcund upon his clothes by his having assisted a lady kill a turkey. This statement made my examination a very easy one. Had he contended that he had assisted to slaughter some of the domestic *mammalia, the science of chemistry* and *microscopy would have failed in adding a link* to the chain of evidence against him, especially as the stains were some *thirty days old* when the clothes were handed to me. The following is the method I adopted in my examinations to prove that the stains were really blood.

First, by chemical tests. Portions of the smeared clothes were digested in water, alkaline salts and glycerine, which yielded me, after several hours' soaking, a solution having the characteristic *red color* of blood, which suffered no change on addition of ammonia, and coagulated on boiling and an addition of nitric acid. These *chemical tests* were *only* used to establish the fact that the stains were, or were not due to blood:—so far, we are not able to find any distinct difference between the blood of man, and that of any other animal by chemical tests, yet it was contended at one time by specialists in this department, that they could discover by the smell of the blood, to what animal it belonged: and *possibly one may educate his nose* as to *be enabled to form an opinion*; and probably a goat (would not a polecat or skunk answer the purpose better?) "may be pronounced upon with certainty by the odor; but it is my opinion that it is better not to rely upon the odor."

Second, by microscopical examinations. The red colored liquor obtained above."*

This fact, connected with the chemical tests, proved that the spots were due to blood, and more than that, the form of the *corpuscles* showed conclusively that it was the blood of the *mammalia*. The *microm-*

*The reader will here bear in mind the quantity of heterogeneous rubbish this expert has added to the dirty, sweaty, saturated clothing to obtain this "red colored liquor," and place his evidence and experiments by the side of the statement made by the microscopist in the poor gardener's case, presented under the microscope, and the method of microscopic investigation of the blood by Rudolph Wagner.'

eter was now attached to the microscope and the corpuscles measured with the following result : size one two thousandth to one four thousandth of an inch ; *average* (!)one three thousandth of an inch ; from which result *it was possible* that the blood *could be* human blood, as these measurements *are the same* as those given by eminent microscopists as the size of man's blood. And they agree *very nearly* with measurements of the globules of my own blood, that of my assistants, and others. But from the fact that the stains were old—the italicising is ours—*I could not possibly state* that the blood I found was that of a human being ; I *could*, and I *did state that it was not the blood of a turkey*, and that it *must be* the blood of *one* of the mammalia. The size of the corpuscles corresponded with those of man ; I could *not* swear it *was* human blood, nor could I on the other hand, state that it was not ; since there was *no means* of ascertaining that the *dried globules* have assumed *their original size*, their measurement afford no proof that they are from the blood of man. At this stage of my examination, *and at the request* of Judge Dwinelle, I telegraphed to San Francisco for my microscope—*as some of the jurors had made up their mind that it was impossible* to detect any difference between the blood of the various animals, birds, fishes and frogs. They could see no difference with their own eyes, and *never* having looked through a powerful microscope they thought it purely imaginary.

The jury were shown under the microscope the following bloods, that of a frog, chicken, turkey, hog, cow, horse, dog, and calf, *and each one compared with the blood of my own finger*, ("but not with the "dried globules" and the "corpuscles" that had not "assumed their original size," and the red colored liquor "digested" soaked from the Indian's clothing.")

The *whole* jury was much interested in these experiments, and the most skeptical of them confessed that the difference between the blood of turkey, chicken and frog, was so great, that it was impossible to mistake the one from the others ; some went *even so far* as to say that they could distinguish with their eyes, and without the use of the microscope, the difference between the blood of a hog, a cow, a calf, and *my* blood. All of them, now, were entirely *convinced* of the *value* and the *reliability* of the *microscope*. The jury found the Indian *guilty*, and on the last day of July, he suffered the extreme penalty of the law ! "Lo, the poor Indian."

Rudolph Wagner, the eminent Histologist, in his "*Special History of Vital Processes*," speaking of analysis of the blood says, "Microscopic study of the blood ought to precede analysis of every other kind. In

examining the blood microscopically, many precautions are indispensable, no other organic fluid being so readily altered by external agencies; the blood that is examined must be quite recent.

We would be understood that we fully appreciate the value of the microscope, and therefore have no desire either to underrate or cast doubt upon the important usefulness of this instrument—which daily speaks for itself. Our aim only is to demonstrate, as far as lay in our power, its truthful and reliable application in its relation to medical jurisprudence, and the great caution that is demanded in cases where the life of the suspected is jeopardized. By the power of this instrument, a flood of light—as well as a flood of nonsense—has been thrown upon the various subjects of research in Natural Philosophy and anatomical and physiological phenomena; to it we owe the spermatic entozoa by *Hamme* and *Lieuwenhoek*, and subsequently the unimpregnated ovule in the *Graafian vesicle* by *Baer*. By it the discoveries by Schwann and others in the cell development, and the wonders of Entomology have been demonstrated. With latest improvements in it we may hope that Histologists will demonstrate the metamorphosis of matter in each and all of the organizations of the whole animal kingdom.

[*To be continued.*]

CHRONICLES OF THE ODONTOLOGICAL SOCIETY.

And it came to pass that the Odontologues, one of the lesser tribes of the people dwelling in the land of the Gothamites, between the river and the sea, said to their friends and neighbors, Come up now and let us gather ourselves together, and take counsel one with another. Behold! we know that it is not good for man to dwell alone, neither for few to bear the burden of the many; peradventure we may find that union that shall be our strength, and we shall get knowledge and understanding, and great good shall come unto us. And it was so, and in the twelfth month, which is the month Adar, on the fourteenth day thereof, the people were gathered together at the great city of Gotham to see what good thing might be found among the counsels of the Odontologues.

And it was night, and they were gathered in the house of one William, whose surname is Bronson. And Aaron, the son of Northrop, one of the elders of the people, had been appointed to rule over the tribe. Now Aaron was a mighty man of valor, and greatly beloved

among all his people, and he was like unto Saul, the son of Kish, in that he was taller by head and shoulders than the rest of the people, and he was a goodly man to look upon.

And he arose and cried with a loud voice, saying, Men and brethren, hearken unto me; and a great silence fell upon all the multitude. And he said, Behold ! we are gathered together from near and from far ; now, therefore, in the name of my tribe, I do welcome you to our counsels, and do beseech of you such care in your deliberations, that none may hereafter say Why did ye so ? but that contrariwise your action may be such that the reproach which we have justly labored under, of claiming to be teachers or doctors, while we were not, may be removed, and that we may shew by our speech, tempered with grace, that we speak the truth and the words of knowledge, and that science has no mean disciples in our tribe.

And Aaron continued and spake again. Behold, there were two who were to have been with us, and to have joined their wisdom to ours in this gathering, but the angel of death passed over the land, and they are gathered to their fathers, and we mourn this day their loss. And Aaron made an end of speaking.

And there arose a voice from among the people, Let certain of our brethren come together and spread upon our record book and to our absent brethren these sad tidings. And all the people said, Amen !

Now when all these proceedings were finished, there arose one named Goodwill, and he took from his breast a roll, larger than the roll that Christian carried in his journey to the heavenly city, and he did read, about the space of five and forty minutes, concerning a way that he had devised to harness the thunderbolt to a tack-hammer, and to make it discharge itself in a multitude of small blows, instead of all at once, as is the fashion of thunderbolts.

And he proved before all the people assembled, to his own satisfaction, that his mallet was favored by the lightning, and that it would jar gently or violently, according to the number of jars employed, and that his battery was not a sell, but cells.

Now when he had made an end of all these sayings, Louis arose, whose surname is Jacque, and he did free his mind of two burdens that lay heavily upon it; one was the abuses of the patent office, which should be a power in the land for good, but which has become perverted and no longer protects him who trusts therein ; and the other was the exceeding slowness of the brethren to see how the electric fluid may be made to work for man, and save him many a backache and much weariness.

And all the people gave ear to Louis, and when he sat down did clap their hands and applaud ; and they answered, He hath well said.

And Aaron arose yet again, and the people well knew that he had somewhat to say, so they did give attention, and he spake to them after this wise :

"William, our host, is a small man, and a modest, and though he liveth not by the vineyard of Naboth, neither by the threshing floor of Boaz; nevertheless, he knoweth that ye have come from far, and that ye are fasting, and he hath prepared meat for you ; loaves of bread and a few small chickens, lest ye faint by the way. Wherefore I beseech you tarry not all of you here, but go, in companies of about two score, and refresh yourselves, but see that ye leave something for those that shall come after."

And after the space of about forty minutes the host saw Edward the Black, wandering aimlessly about, and he stopped him and said unto him, Behold, I know now that thou hast not obeyed the voice of Aaron, neither hast thou eaten of my cheer. And Edward answered and said, How knowest thou that I have not eaten? William said unto him, Because even now as I came by I looked and beheld a large amount still unserved, enough to feed many men withal, so knew I that thou hadst not partaken.

Then did Edward, being thus reproved, descend, and obeyed all the apostle's injunction and more too, and he did eat all that was set before him, asking no questions for conscience' sake. And the next day there was a famine in that house.

And when all the people were filled, and every man had become acquainted with his neighbor, and had said unto him that he was pleased and happy, then took every man his departure, and left his peace with William, the host, and that night did William sleep the sleep of the just, and it was sweet.

And the next day, when it dawned upon the multitude that they had work before them, they were all assembled together with one accord in one place. And William, the scribe whose surname is Jarvie, arose and read the roll of one Cutler, a great and mighty man whose home is in the setting sun ; and the paper did set forth what he knew about amalgams, and the composition thereof, and the weight thereof, and the value thereof ; and all the people did clap their hands, and with one accord did pronounce it good.

And scarcely had the clamor died away when Thomas the doubting, commonly known as the Chandler, arose and began to read, and as he

read, a great silence fell on all the multitude, for the roll that he read was written by the other Thomas, the believing Thomas, surnamed Hitchcock, and he is taken to his rest, and all the tribe knew and loved him, and they did mourn sincerely for him, and when his last words were read in their ears, they hearkened and gave heed. And Hitchcock's paper was upon the same subject as its forerunner, and gave many interesting facts about amalgams that are not generally known, and that ought to be known by the whole tribe. So there was silence profound for the space of about an hour, and then, when the paper was ended, there arose a shout of joy and gladness that such a paper should have been written by him whom they loved.

And behold the sun gat high in the heavens, and it was near noon, and Edward the Black arose with still a third paper upon the same subject, and he had a just conception of the value of his paper when he declared that he should skip the greater part of it, as it was too tedious to read. And the people were wearied and not restful, nevertheless they were kind, and remained yet another forty minutes to hear the roll of Edward upon amalgams: and although it was like the crackling of thorns under a pot, still they sat it through to get at the kernel which came at the last. And he declared unto them, that of all the amalgams that are in frequent use by the whole tribe, not one was in the slightest degree detrimental to the human health, provided that they be not used as an exclusive diet. And while they remain in the teeth as fillings, he asserted that no mercury could be found in the oral fluids from never so much amalgam well put in.

Now when he had made an end of speaking, a great hunger seized upon all the people present, and as it was not the time for the feast of tabernacles, they adjourned to the houses of the brethren, and to their several abiding places, to get bread. And when all had eaten and drunken, they came again to their assemblage, and William the scribe read a scroll relating to the Black art, the title whereof was Gold. And as he read, the countenances of the assemblage changed greatly; for some said within themselves, Behold ! this paper is too deep for us, neither can we understand unless some man explain it unto us ; other some said, It is well and good for us to be here, that our ears may hear the accumulation of the knowledge of this Black, for see, verily he understandeth the things whereof he speaketh, and by many trials which he hath made hath he proven the things that he affirms. And these latter were lifted up in spirit, and their faces did glow with joy, while the countenances of the former fell, and they murmured among them-

selves, Why should this fellow impose upon us things that are too deep for us, and that are no nearer to our understandings than molecules? Why doth he not give us something practical? And the people were divided in spirit.

Now when the scribe had made an end of reading, William the doughty, surnamed Atkinson, arose.

Now William was a mighty man of force among his people, and one of the elders, withal, and he cried out joyfully, Behold! this day is my heart glad and rejoiceth greatly that one of our number is able to give us such a paper as that. Never have I seen its like before, and I verily believe its equal has never been written. It is for this very thing that I have labored, lo! these many years, and now that my labors are bearing such fruit, my heart is filled with joy and runneth over toward this one Black, whom, not having seen, I love and am proud to number among my disciples.

Ye well know that I have often said unto you that the unconditioned differentiated the atoms, each after its kind, and their combinations begat rock, air and water, and that the spirit of evolution from the unconditioned, working in protoplasm by accretion and absorption, produced the organic cell; hence the protogene, eozoon, and the ephemera, the mollusca, the ascydian and the pentadactyle, the hylobate, the anthropoid ape, and so on to man, all the way from silex to seraph.

Crystalosophy, cellosophy and corpusculosophy, in their togetherness, constitute the tripod upon which natural philosophy may now stand erect—and William the doughty sat down; and no man dared to answer him, neither murmured they any more among themselves, nor desired anything practical, for they were overcome with his words. Now after a space uprose Norman the Conqueror, the son of Kingsley, and he was small of stature, but great in his own thoughts, and he said within himself, Peradventure this people will consider me like unto one of themselves, whereas I am not. Go to! now, let me tell them what I have seen, then will they see as I do.

And he opened his mouth, and said unto them, Men and brethren, in the past time came an epistle unto me, saying that, forasmuch as certain of the sons of men were hatchet-faced and sharp in their visage, and of a V-shaped face, that all such should be regarded as fools, or the sons of fools or lunatics, and I believed not that witness, but I gathered my goods together and took my journey into a far country, and I visited all the fools and lunatics in that land, and other people saw I none saving only these fools and lunatics, and a few Cretins.

And after careful examinations, very searching, I turned again to the land of my fathers, bringing my sheaves with me. And he went on from thence and expounded the matter little by little for the space of about ninety minutes.

And all the multitude gave ear and were silent, for they were astonished at his doctrine, inasmuch as he spake as an authority and not as the scribes and the copyists, and when he had made an end of speaking, the people clapped their hands and rejoiced, and were exceeding glad, and said one to another Verily, each paper is better than another, and this last is better than they all.

And they longed for the evening to come, that they might still further hear what was in store for them.

So they separated and went each his own way to ruminate over all that they had heard that day.

Now when even was come, they all gathered themselves together with their friends and neighbors to the house of the Lord, Benjamin by name, and one or two who were not bidden came also. And Benjamin was disturbed in his mind, for saith he, Aaron tarrieth long and is not here, and I, even I, am next to the chief of the tribe, and it will be mine to call to order, and to bring order out of this disorder. And it grieved him sorely to do this thing, for he was a modest man.

And it was with him as with Naaman the Syrian, when Elisha bade him go wash in the Jordan, yea, more, it was as if the Jordan had been frozen over and he had been bidden to go wash seven times in the river. Nevertheless, being a just man, and one that feared to do other than that which it was his duty to do, he essayed the task.

And behold all his kinsfolk and neighbors became as lambs for quietness, and they lightened the burdens of the vice ruler with all their might, for Benjamin was well-beloved among his people, and none would see him suffer.

So James the Trueman arose, and all the people hearkened. And he spake many a truth in their ears that night, and showed how the tribe might greatly enlarge its borders and its importance in the land, and he proved himself to be zealous of good words and works.

Then Thomas the doubting, who dwells in the land of the Athenians, arose and gave himself to consider the question of the young of the tribe, how best they should be taught to use their powers and to become useful for good among all the people of all lands. And James, the man of altitude, and descending from a Garret of Philadelphia, arose and said, Now am I rejoiced, and my heart doth swell within me to see and to hear the things that I now have heard. Behold! I have

been ashamed of my brethren but now am I proud, and glad that they are here gathered together to enlarge their boundaries and to cultivate their powers and to become greater and better men than they now are.

And when he was set, there arose one from the same city, being prompted by Mac the Dean, the son of the scribe with the quill, and said, Verily our craft is in danger, and do we sit here tamely while the source of our wealth is attacked, and do not defend it? Behold! are not our Colleges already established, and bringing in large numbers to the tribe and large incomes to the Professors?

Should we let go of one rope before we have hold of another? Nay, verily, but come with us and for the same amount of filthy lucre will we give you more than any other one in the same calling. And his words pleased many of those that heard him, because of the saying about the rope.

But some were more noble than others, and some more dull, and they saw not the connection between the rope and the training of the young, and so a peace fell upon their minds, and they were tranquil. And they rose up to partake of the bounties of Benjamin, and to hold sweet counsel together over the cheerful cup and the cooling meats. And the next day, when all were gathered together again, one like unto the Conies, who are a feeble flock, asked if the continued extraction of the sixth year molar would not make a contracted jaw and end in the disappearance of the sixth year molar altogether.

And William the doughty arose quickly and said that from the days of Abraham down has it never been known that the Jews were different from other men, or any of their members wanting, though they have always been circumcised. And the chronicler was shocked at this saying, and his modesty wounded, and he departed thence.

And the rest of the doings of this tribe, are they not all written in the chronicles of the book in the hands of the scribe.

And each man went to his home rejoicing.

CARVACROL.

By H. L. Sage, D.D.S.

Among the therapeutic agents recently introduced in dental practice, Carvacrol has been found to be a valuable adjunct; so that it has received the endorsement of dentists whose opinions are valuable and entitled to respectful consideration.

It is, however, unnecessary to repeat what has already been said

concerning it; but anything new in relation thereto, even if not of a practical nature, may prove interesting.

Those who have had experience in the use of this agent, know that, if judiciously employed, it is entirely safe in its action when locally applied; and my own individual experience is, that it may be taken internally in very minute quantities without injury, and in some cases, as in bronchial and throat affections, with benefit.

The quantity that would constitute an excess, must of course be determined by future careful and patient experiment. At present the indications are, that its chief value consists in its *local* rather than in its constitutional employment, the drift of experience having thus far demonstrated its value in the former direction.

Carvacrol is no exception to many preparations of a similar nature, which indiscriminate and careless exhibition will render poisonous; while if employed under proper restrictions and conditions, graduated in manner and quantity, they will not only prove harmless, but positively beneficial. This could be shown to be the case in regard to the agent under consideration; but that is not the object of this paper, as the report of the following case will show,

On the evening of November 9th, 1874, about 9½ o'clock, Prof. W., chemist, Col. S., and myself, were in the laboratory of the former gentleman.

I applied carvacrol to the outside of a cigar which the Colonel was smoking, that he might note its effects.

I had occasionally done the same thing by way of experiment, with no results other than to change the flavor of the tobacco.

A kind of drift-wood which floats down the Connecticut river, and of a very light and porous nature, I had also saturated with this agent, which it freely absorbed; I had then smoked it simply for the purpose of noting its effects. They were not marked, though rather pleasant than otherwise.

Prof. W. having a pipe charged with tobacco, unscrewed the handle and requested me to put ten drops in the reservoir at the base of the bowl, which I did. He then readjusted the handle, and lighting the tobacco commenced to smoke, and so continued to do for perhaps two or three minutes.

The heat from the burning tobacco passing over the carvacrol, rendered it volatile, converting it into vapor, which was rapidly carried into the system.

He then ceased smoking, remarking that "he felt it in the back part

of his head," but conversed so naturally, that, if other effects were produced, they were not noticed.

After an interval of five minutes, he requested that the pipe be charged as before, by the addition of ten drops. His request having been complied with, he sat down and again commenced smoking, and thus continued to do for a minute, saying, "Gentlemen, I can stand it," when he suddenly fell over, to all appearance apparently lifeless; a result entirely unexpected. Col. S. caught him as he fell. The water faucet being near, I applied cold water freely to his forehead and vertes, when he quickly aroused and stood up. He remained in the laboratory for about fifteen minutes, conversing freely and in a somewhat excited manner, during which time he was not again prostrated.

He was very anxious to repeat the experiment, saying, "Gentlemen, this is for the good of science," "I can stand it," "I will take the responsibility," etc., but we strongly protested against it, and persuaded him to accompany us from the laboratory.

The fresh air did not seem to benefit him, for after going a few paces he began to stagger. We supported him as he fell, when he very soon regained his feet. About twenty rods distant was the office of Dr. D., which, seeing the state of affairs, we endeavored to reach, and finally succeeded, after he had been prostrated at least six times; immediately after he entered the Doctor's office, he fell to the floor and stopped breathing, as he did in all the preceding paroxysms and those which followed. At this time his pulse stopped beating, and probably when he was prostrated in the laboratory, though there was then no time for examination.

His lips were also livid, though in the subsequent attacks, which gradually diminished in severity and frequency, this symptom was not so apparent. We resorted to cold flagellation, artificial respiration, and in a few minutes gave him brandy.

Subsequently aromatic spirits of ammonia and tincture of assafœtida were administered, and later in the evening another dose of brandy. Every few minutes these attacks would recur: during the intervals he would appear as well as usual, was in good spirits, and conversed freely.

He would say, "Gentlemen, I feel like a top," and, supported by us, would attempt to walk, but after going a few steps would fall over and resume his anæsthetic condition, (if so it may be termed,) and which had that appearance excepting the suspension of respiration. We could not keep him in a recumbent position, as he persisted in sitting up.

Naturally enough, Dr. D. was anxious to have other physicians see

the case, for these effects being produced by an agent with which he was unacquainted, and for that matter he did not know what the ultimate issue might be, and under the circumstances he deemed this a prudent step, though none of us anticipated fatal results, as the most critical periods had passed. These seemed to be when the patient was prostrated in his laboratory, Col. S. and myself being present, and on first reaching the Doctor's office, when he fell and his pulse stopped beating; though in subsequent attacks it was normal in its action.

After a half hour had elapsed, a messenger was dispatched for Dr. H., but he not being at home, Dr. W., a promising young physician, was called, who rendered valuable assistance by the application of the battery and otherwise.

As this was an interesting case Dr. P. was made acquainted with the facts, and about 11 o'clock came in, that he might with us note the effects. About 12.45 o'clock Prof. W. was carried home, placed in bed, and soon went to sleep, resting quietly until morning with no recurrence of the symptoms.

The direct action of this anæsthetic, (if so it may be termed,) seemed to be upon the cerebro-spinal system, thus interfering with the respiratory functions by producing tonic contraction of the muscles of the chest and abdomen, characterized on recovery by spasmodic gasping, respiratory movements, the muscles of the abdomen also relaxing; while, during the continuance of the unconscious state they were hard and rigid.

Speaking was also rendered somewhat difficult, as stated by the patient, though not to a noticeable extent, which difficulty was experienced for several days, showing that the laryngeal muscles may have been affected. The pupils were not dilated.

On the morning after the prostration, Prof. W., though complaining of great lassitude and a general "breaking up" of the system, was not quite incapacitated from attending to his duties, owing in some measure, doubtless, to his determination to "fight it out."

A month elapsed before he entirely recovered from the effects; the kidneys being the organs most visibly affected, owing, doubtless, to the fact that, through them principally, the medicine was eliminated from the system, the urine being strongly charged with the odor of carvacrol for days afterwards.

We had suspected that carvacrol, though but slightly volatile at ordinary temperatures, might be made to produce anæsthesia by the application of heat sufficient to transform it into a vapor.

But in this case, the effects above mentioned might not have been entirely due to the action of the vapor of carvacrol.

The latter is a powerful solvent of many substances, among which are gutta percha, the ordinary unvulcanized red rubber, or dental gum, camphor, etc.

Now, may not the nicotine which had lodged in the base of the pipe, have been, by contact with the carvacrol, dissolved, and with the latter passed into the system in the form of vapor?

That a chemical combination may have been produced with an effect upon the system entirely different from what would be produced with the vapor of carvacrol alone, it is not unreasonable to suppose, judging from the fact that the effects upon myself, as above noticed, were very slight.

Of course an isolated experiment cannot be depended on to settle a scientific question.

Moreover, it is not likely that any one would risk the consequences of repeating the experiment of inhaling the vapor produced by a combination of nicotine and carvacrol.

As the article in the Philadelphia *Medical Times* of Dec. 19th, in relation to this case, needed some elucidation by a more thorough recital of details, this must constitute my apology for the presentation of this statement, together with the fact that further information is solicited upon the case in question.

Briefly stated, carvacrol, locally applied, in full strength or diluted, possesses antiseptic, disinfectant, sedative, stimulant, irritant, slightly caustic or escharotic and rubefacient properties.

It is employed in dental practice as a sedative to exposed and aching pulps, and as an obtunder of sensitive dentine, for which it is eminently adapted.

It has also been found an effectual remedy in alveolar abscess, in cases where an agent with more pronounced escharotic properties is not essential; though, in my own practice, some chronic cases have yielded to treatment where carvacrol alone was employed.

In abscess complicated with carious or broken-down process, the elixir of vitriol might be a more suitable remedy.

For disinfecting root canals, and applying to pulps before capping, it may be employed with advantage. Also for lubricating burrs, in order to diminish the sensitiveness and friction produced by their employment in preparing cavities for filling.

Young and soft teeth, especially, will often respond with promptness to this treatment.

It is likewise valuable as a solvent of gutta percha for root fillings.

In full strength, or diluted according to the indications, it is efficient as an application to inflamed mucous membranes, "canker patches," etc.

I have found it exceedingly efficient as a gargle for tonsillitis. It may be employed in the proportion of about six drops to the ounce of water, with very good results in most cases.

It may doubtless be made efficacious in many directions in medical practice, some of which my experience may lead me to report at "a more convenient season."

HYPERTROPHY OF THE PULP.

By W. Irving Thayer, D.D.S., Brooklyn, N. Y.

Katie B. was sent to me from the hospital about October 1st, 1874, to have some badly decayed roots taken out. Before performing this simple operation, I examined her mouth, as I do all my patients, to the intent that I may be the better able to tell what to do, and what not to do.

I noticed that she had some of her teeth that were decayed, and among the number was the left first inferior double tooth, or, (in a better nomenclature), the left inferior six-year molar. One-half of its lingual wall from the median line, (that is the linguo-buccal diameter) posterior to a plane with its posterior wall, was decayed away to within about the sixty-fourth of an inch above the soft tissue, (gum line.) I knew that the pulp was exposed, as there was *slight* pain from the pressure of a pellet of cotton, though nothing was visible of the pulp.

The roots, whose soft tissues, (peri-dental membrane) was badly ulcerated, was removed, the abscess coming with the roots. The patient was dismissed with instructions to call in a few days and have her decayed teeth attended to.

About eighteen days elapsed before she put in an appearance ; the six year molar was the first objective point both for the patient and the dentist. "What's the matter with this tooth, doctor? See there," putting her index over the grinding surface of the molar. "I can touch something, it hurts a little ; what is it?"

Well, what was it? It was an *enormous* hypertrophied pulp. And again, *pulp hernia.* I have seen hernias of the pulp before, in a somewhat limited form, but this was elephantine, except in color.

Please bear in mind that the periphery of the cavity was above the line of the gum, so that the observer was *certain* that no gum tissue grew up, or into the cavity of decay.

I placed my finger over the tooth, (grinding surface), and could distinctly feel something soft and yielding under my finger. I next examined with my mouth mirror, and could see something above the plane of the grinding surface. Next in order an excavator performed a delicate survey.

Familiarity, by degrees, brought boldness. *Slight scratching* would bring blood in *profusion.* I was exceedingly cautious in my approaches to this cauliflower, fearing that this abnormal growth might depart from the general law and take on hyperæsthesias. But 'twas not so. The sensibility was exceedingly low, and was tolerant of much grief.

Once I should have given this intruder a dose of arsenious acid, but such a thought, (thank God), never enters my mind now. Better days are dawning. If the *fiat is,* "Thou shalt not steal," how hast thou broken the commandment, if thou takest no more than a pin !

Again, "Thou shalt not kill." Therefore if the finding of the above verdict is correct, the destruction or murder of a dental pulp is just as much a sin as pin stealing, and, *out-and-out murder.*

Since our best practitioners do save a large majority of pulps that have been, or are exposed, it follows that that practice is not a mere hypothesis, but is truly what dentistry should consist of, to wit: a conservative practice, not a destructive one. The merest tyro knows the consequences of the death of the pulp ; yet there are good men to-day, who too frequently practice this *sin.* About ship, and make for the conservative shore, and my word for it, you'll never regret it.

To return to our hypertrophied pulp ; all abnormal growth was excised down to the hernia, or floor of the cavity of decay. The growth proceeded from the anterior buccal portion of the pulp chamber, and was quite difficult to reach. I made a concave hatchet to perform the operation, with which I succeeded in about twenty minutes of accomplishing. There was not less than a drachm of blood lost by the operation, and when we remember the minute foramen through which all this blood must come, it seems as though my statement might be excessive ; yet it is not overdrawn.

My endeavor was to make my amputation below the constriction, to the intent, that if hyperœmia supervened, the engorgement might have some space to expand in. It may be imagined by some who have never wounded an exposed pulp, that it is particularly hazardous;

but it is not so when there is congestion. It is not safe, and will almost always result in the death of the nerve, to attempt to protect and cover an exposed nerve, *when it is congested.* Seldom, perhaps never, is a freshly exposed nerve found to be congested. It is those that have been exposed more or less. And the latter, if treated in any manner whatever, without depletion before covering, will, as a rule, disappoint the operator.

After excision of the abnormal growth, below the floor of the cavity of decay, washing away the coagulum of blood with tepid water, *thoroughly* excavating with the Morrison Engine the periphery of the cavity, I placed a *large* pellet of cotton saturated with creosote over the pulp, and *absorbed* the excess of creosote with other dry pellets of cotton till they came away clean, leaving my first pellet in its original position. Note that I say *large pellet of cotton,* for just here I think one grand cause of failure is that pulps are *compressed* by some unyielding substance and no provision made for any determination of blood to the parts. I use my first pellet *just as large as I possibly can* in the cavity I am to operate in, and extent of pulp exposure is taken into consideration, and at the same time reserve *a little* room to retain my Hill's Stopping or Cement Plombe. After having placed my *large creosoted pellet* in position, in this case I covered the whole with a stopping of my own manufacture, analogous to Hill's, but capable of more wear, and dismissed my patient.

After three weeks' trial, all remaining normal, I cut out a part of my stopping and filled with good amalgam. Now an interesting inquiry is, Is that pulp alive? It is; and, as it has been some four months since treatment, and all has continued peaceful, who will retort, "You'll lose it yet"? If I do I'll tell you. But nevertheless, your predictions will fail, even though my patient was of a strumous habit.

CHEMICAL VERSUS GALVANIC ACTION ON THE TEETH.

By Thomas Fletcher, F. R. C. S., Warrington, England.

In a note on this subject by Dr. A. C. Castle, published in the Miscellany, December, 1874, he refers to my "indistinct wording," and has apparently misunderstood the intended meaning of my communication. If I erred, it was out of consideration for the value of space in the Miscellany—putting the matter in the fewest possible words. My object was to show that the failure of plastic fillings, which require some length of time to harden, depends in many cases (if not in all), on the mechanical alteration in their form, which takes place *before they have time to harden.* This alteration, which is totally

independent of shrinkage or expansion, being caused by the capillary force of moisture with which they are in contact, and that the only means at present known to prevent this action is to varnish, or render waterproof, the cavity, and to protect the edges of the surface of the plug with varnish until it is hard. I did not intend in any way to refer to shrinkage, but to mechanical alteration of form only. Dr. Castle states that amalgams do not possess sufficient conservative force to preserve perishable decayed teeth forever, any more than is boasted of for gold. It would have been better, before making such a statement in so public a manner, if Dr. Castle had obtained the opinion of a few operators who had been in the habit of using Precip. Silver Amalgams, or Sullivan's Precip. Copper. Either of these compounds exerts such a strong preservative action on the dentine, that they are safe fillings in the hands of the most utterly incompetent, and they have been used successfully for very many years by those who are unable to use any other material with success. I do not wish to refer to the color or other properties of these filling materials, further than the known fact that they have the power of hardening and preserving soft and partially decayed dentine ; nor do I wish to enter into any discussion on the question of amalgams, whether of *American* manufacture or otherwise. My sole object was to point out a mechanical cause of failure which has been overlooked, and which, as I have proved in the mouth repeatedly, can be entirely overcome ; thus placing *a good* amalgam on a par with the most carefully-inserted gold plug, as regards permanent value and freedom from discoloration of tooth-substance ; and giving, in my opinion, the flattest possible denial to the theory of galvanic action, which has been started by some as a means of explaining their failures.

TWO CASES OF ANÆSTHETIZATION DURING SLEEP.

Having read in the April number of your journal an article entitled "Can a Person be Anæsthetized during Sleep?" it occurred to me that a brief report of two cases of successful chloroformization during sleep might prove interesting.

The first case was that of a little girl named Parsons, aged eight years. As a sequel to acute otitis media, the mastoid cells of one side became inflamed, and Dr. E. M. Curtis was invited to take charge of the little sufferer.

Deeming it expedient to operate for the evacuation of the pus as soon as convenient, we agreed to meet at nine o'clock of the following morning for the purpose. On our arrival, we learned that the patient

had slept but little during the night, but was then sleeping sweetly. Chloroform was at once administered upon a four-by-six piece of surgeon's lint, held as near the child's mouth as possible without coming in actual contact. Not the slightest effort was made by the child to avoid the inhalation of the anæsthetic, and in a few moments she was well under its influence, and was immediately carried into an adjoining room and placed upon a lounge, where the doctor very soon completed the operation.

The child being still anæsthetized, the wound was dressed, and before she had fully regained consciousness we both left the room, having first given proper instructions to the parents. On making my evening visit, I was informed that my patient was not yet aware that she had undergone a severe surgical operation, or that either Dr. Curtis or myself had visited her on that day.

My second case occurred on the 15th inst., in the person of a little girl two and a half years old, named Drake, brought to me from Galena, Nevada, for the purpose of having a supernumerary toe removed from each of her feet. While waiting for the arrival of Dr. Nelson, who assisted me in the operation, the child fell asleep and was placed in the operating-chair. As soon as the doctor arrived, chloroform was administered in the manner already detailed in the former case, and with equal success, and the operation was soon completed without the occurrence of an unfavorable circumstance.

In the first case the condition of the child probably favored the ready induction of anæsthesia, while in the second, age alone could be supposed to have influenced the result.—*Dr. R. W. Clunes,* in *Pacific Med. and Surg. Jour.*

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THE DENTIST'S ARM-CHAIR.

No. 1.

I hate it, I hate it, and oh! who shall dare
To chide me for hating the Dentist's Arm-Chair?
I've sat in it long, shedding many a tear,
With mouth wide extended, from ear unto ear,
My shrieking and groaning and sobbing in vain,
No matter how deep or tormenting the pain.
And oft I've endured with the wail of despair,
Alas! quite too much for a mortal to bear;
No voice of compassion to comfort or cheer,
Entreaties I waste on a pitiless ear;
That hand unrelenting still cruelly pokes,
And throbs of wild agony coolly evokes;
Those borers, and scrapers, in frightful array,
They drive me to madness; I'm filled with dismay;
I hate, oh! I hate it! and who then shall dare
To chide me for hating the Dentist's Arm-Chair?

No. 2.

You say that you hate it; but yet who shall dare
Deride me for loving the Dentist's Arm-Chair?
I've sat in it long, and serenely, and oft,
With bright crimson cushion of velvet so soft;
I've sat in it calmly, with never a fear,
For I knew that the head of the dentist was clear,
His hand firm and steady, his heart kind and true,
I feared not the things that were frightful to you:
Those instruments keen had a mission to save
My molars from pain and a premature grave.
It may be your dentist is what's called a rough—
Perhaps worse, a bore, and sure that is enough
To drive one to madness, dismay and despair,
And cause a false dread of that soft-cushioned chair.
Since practice and skill are so wisely combined
To guide and control every well-tutored mind,
My fears are all banished, and hence I declare
My trust in the dentist, my love for his chair.

L. Parmele.

JOHNSTONS'

Dental Miscellany.

Vol. II.——*MARCH, 1875.*——No. 15.

TREATMENT OF IRREGULARITIES.

By Norman W. Kingsley.

The case here illustrated was that of a boy thirteen years of age, concerning whom there was no other marked peculiarity, either mental or physical, than the irregularity in position of the teeth, and a somewhat retarded second dentition. Upon a careful observation of Fig. 1 it will be seen that the second temporary molar of the left side has not been shed, and that the crowns of the first bicuspid of the same side, and the canine of the right side, are imperfectly developed. The crown of the latter was pointing, and locked within the lower teeth on occlusion

The articulation—which it is not deemed necessary to illustrate—showed all the teeth behind the six front, to be in their proper places, but the canine of the right side and the central incisor of the left, were locked within the lower teeth, and the others in varying positions of twisting and lapping, as is fully shown in both illustrations. The articulation also showed that the superior arch would bear sufficient enlargement to bring all the teeth into line, and without giving undue prominence to the upper lip.

The detail of changes required, was to bring out the canine, twist the lateral incisor, twist and bring forward the central incisor of the right side : on the left, to twist and bring forward the central, bring forward the lateral, and reduce and carry back the canines.

This was all effected with one appliance made of a vulcanite plate, as described in former articles, with a gold wire anchored in the plate and

passing around the outside, as shown in the engravings. This, with straps cut from rubber tubing, constituted the whole apparatus.

To understand its workings the illustrations will have to be closely observed.

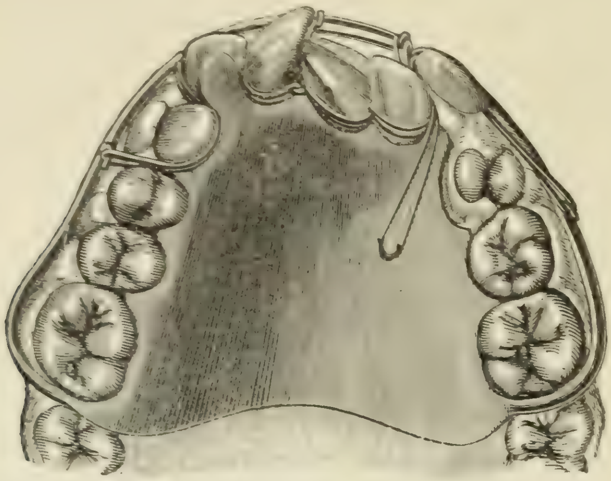


Fig. 1.

A semi-circular slot is cut through the plate, forming a little tongue upon which is caught a ring of tubing; this is drawn between the lateral and canine, comes forward of the canine over the wire band, and carried back and caught on a hook—a part of the band—opposite the bicuspids. The contraction of this ligature, it will be seen, will carry the canine back, and the pressure exerted by its being brought over the outside of the wire will tend to depress the tooth. The plate is carried up nearly to the canine, so as to protect the gum from being cut into by the rubber, which it would do without such provision.

There are two hooks on the wire in front, opposite the central and lateral incisor, seen distinctly in Fig. 2. The lateral incisor of the left

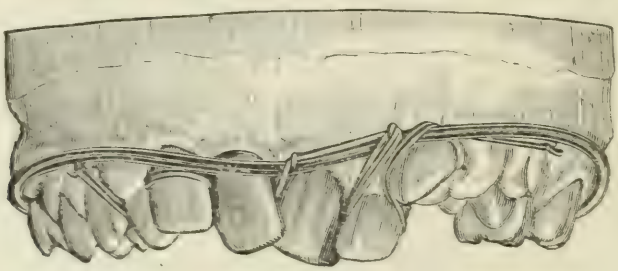


Fig. 2.

side is operated upon by a ring of smaller rubber tubing caught over it, and the one hook next the canine.

The left central, which needs twisting as well as bringing forward,

has a rubber ring caught over both hooks. The action of this ring will bring the tooth bodily forward until it comes in contact with the wire. If, now, the ring were caught over but one hook, this would be the end of its action; but being caught over both hooks, and they being properly placed, and wide apart, the contraction of the elastic will continue after the nearest point of the tooth has come in contact with the wire. This contraction can only exert itself between the hook next the canine and that side of the central, and twisting is the result. The right central incisor, seen in fig. 1, is a stubborn offender.

In the model and in the mouth it was still more twisted than appears in either of the engravings. Its cutting edge was at nearly a right angle with the wire band. Its forward edge was not too prominent, and the wire band rested against it. I first attempted to twist it by the same arrangement of ligature as moved the other central, but it failed. It was too much twisted, and I could get no hold. I tied and re-tied ligatures in various ways, and of various kinds, but without effect, and ultimately resorted to the insertion of a peg on the lingual and crowning surface of the tooth near the gum.

This peg, which unfortunately is also indifferently shown in fig. 1, was made of pivot wood, and was about the size of the gold screws now used for the better retention of contour fillings. Had such a screw been at hand at the time, I should probably have used it, although a wooden peg is of equal service.

With one elastic ring caught on this peg, on the inside of the right central incisor, a variety of movement was accomplished. As seen in the engravings, it passed from the wooden peg between the central and lateral, around in front of the lateral, back between the lateral and canine, around inside the canine next to the bicuspid, and then caught on a hook attached to the wire opposite that tooth.

Its contractile movement would first twist the central: secondly, it would depress the lateral, and bring that within the arch, were it not for a branch or process of the plate coming forward and resting on its lingual surface, which supports it and prevents the reduction. Thirdly, the canine is pulled bodily toward the wire band. This system of plate, band, and ligatures regulated these teeth perfectly, and a retaining plate made in substantially the same way kept them in position until they became firm. The retaining plate was, of course, adapted to their advanced positions, and the wire, which at first formed a part of it, was afterward removed, as its only function was to hold the canine of the left side down to its place. The plate, minus the wire, was worn for

a longer period, but only for a few weeks, as the articulation of the lower teeth was so admirable as to make a retaining plate unnecessary.

It must not be supposed that making and adapting such an apparatus as this was all that was done to regulate these teeth. While this is the appliance which was used, and these are the principles which governed its action, the application of these principles and the adaptation and retention of the fixture were a severe tax on one's ingenuity and perseverance. In the beginning, a variety of methods in the arrangement and attachment of ligatures were resorted to, some proving a success, and some ending in failure.

The action of the elastic, which is caught in the centre of the plate, and passes over the canine and wire, has an inevitable tendency to pull the wire down and throw the plate, wire and straps, all out of place. In this emergency a waxed floss, or flax thread, was passed around the neck of the right central, and the wire tied immovably to its position. As the canine became reduced this tendency decreased, the elastic ligature at the same time getting a better hold over the swell and around the neck of the canine.

Again, at certain stages it seemed desirable to rest from active aggression upon some of the teeth while the work continued upon the others. Thus the left lateral incisor was becoming more tender than the rest, and exhibited symptoms of elongating, and it was favored by releasing all strain upon it and gently tying it to the band, to maintain what it had gained, and await its recovery.

Such a complication of abnormalities is very difficult of mastery. The inclination of the crowns, and the peculiar form which their roots may possess, serve often to make what may seem a simple case, one of very difficult accomplishment, and the length of time that will be required cannot be foretold—the experience in one case being but little criterion for another one similar in appearance.

In this case the patient was in my hands for this purpose ten weeks and then discharged, the retaining plate only being required to be worn longer.

The passage of the canine and central out of the lock of the lower jaw was accomplished within a few days.

There were no blocks built up on the lower jaw to open the articulation for that purpose. Indeed, in all the cases I have treated—and they have been many and constant for years—where some of the upper teeth were locked within the lower ones, I never made, in any instance, any apparatus to keep the jaws apart during such movement. I em-

phasize now this fact, more because I have seen a work just published, from the pen of Mr. Salter, of London, in which a "gag," as he terms it, becomes an important and necessary adjunct in his treatment of such deformities; such an appliance being in my own experience a cumbersome and unnecessary affair. It is necessary only when the operation of moving the offending teeth is suffered to drag itself along through many weeks or months. In such cases the molar and bicuspid teeth being long kept from contact and natural occlusion might elongate and permanently destroy the articulation. Such cases I have seen, entailing great injury upon the patient, but the fault was not so much the failure to build a "gag" on the lower teeth as it was defective method of treatment of the upper teeth, making it a long and tedious process.

With suitable methods and fixtures there need be but very short time consumed in the passage of the teeth, so that their cutting edges can be caught outside the lower teeth, and from that moment the presence of the "gag" would be objectionable, and prior to that time, unnecessary. No very severe mastication will be performed or attempted upon tender teeth, and no masticatory force can subvert the constant action of properly applied elastic ligatures.

A NEW METHOD OF APPLYING THE RUBBER DAM.

By S. F. HAM, D.M.D., Boston.

Having had great difficulty in applying the Rubber Dam by the usual method of fingers and ligatures, and in many cases failing after a half hour's effort, it occurred to me that possibly the object might be accomplished more readily, by bringing into requisition the clamp and forceps at once, making them do the work heretofore done so unsatisfactorily by the fingers, as follows:

Let the rubber be punctured in the place desired, over the end of an instrument, as described by some good fellow (I do not recall his name), not long since, in one of the Dental Journals of the day, thus securing an unbroken edge, which I regard as of the utmost importance; now stretch the rubber till the aperture admits freely the beaks of the clamp; with the forceps in position, fold the rubber about them closely, so as not to obstruct the vision, and apply to the tooth in the ordinary manner.

Apply the Cogswell holder, and with a small right-angle burnisher, or

round, smooth instrument, slip the rubber below the clamp on either side, and the work is done. There is no need whatever for ligatures of any sort in a large majority of cases, if the hole in the dam be not too large.

For crown, lingual and labial cavities, if the teeth be ever so crowded, I never find it necessary to force the rubber between, but simply allow it to remain drawn down tightly over them.

I have used the above method with great satisfaction for the last year, and think it a valuable acquisition to my knowledge in practice. I do not think I should rate it at par with the *discovery* of the dam, but, joking aside, I do think the dam, clamps, and forceps, with the above method of application, should be inseparable.

FALLIBILITIES OF SCIENTIFIC EVIDENCE IN MEDICAL JURISPRUDENCE.

By A. C. CASTLE, M.D., New York.

(*Concluded.*)

Dr. J. Stuart Wilkinson, M.R.C.S., one of the most distinguished of eminent microscopists, says : "The study of the microscope is difficult ; at first an air bubble is a corpuscle with walls and contents. A small fibre from a cambric handkerchief which has cleaned the glass, appears in the field a new fibrous tissue, etc., etc.," and he adds—"That a little reflection must make it evident that chemical modes of investigation, however excellent, are by no means applicable in all cases, nor are tests available in all instances."

The following case illustrates the correct view taken by Dr. Wilkinson. A short time since a man was tried for murder, in England. The throat of the deceased was cut by a sharp-edged instrument. A razor was produced in evidence, perfectly clean, with no trace of blood on it, but the microscopist for the prosecution undertook to prove that this razor was the instrument by which the accused cut the murdered man's throat. His proof rested upon a *single fibre* of cotton entangled in an infinitesimal—if we may apply this word—notch in the cutting edge of the razor which he said was a fibre of the *same* cotton lining the neck-tie of the murdered man, through which the razor had passed deep into the throat. The presiding Judge said, while he "fully appreciated the usefulness of the microscope, such microscopic attenuated evidence ought not to be entertained for a moment."

Micography is liable also to misrepresentation, caused by, and attending abnormal conditions of the organs of vision. An oversight not to be underrated, and we take this opportunity of drawing particular attention to it, and cannot too strongly emphasize our statement.

Many persons engaged in microscopical investigation are of nervous temperament, or are of plethoric habit, or dyspeptic, or "at times," from some other causes, are sympathetically affected with an increased or diminished sensibility in the organs of vision, thereby super-inducing either a super-excited or a diminished arterial circulation of the *red*, or of the *transparent* blood in the eye, producing the affection of *muscœ volitantes*, or motes. These "motes" present various forms and character. They appear, apparently, as if they were floating at a distance in front, or before the eye, while in fact, they are *within* the eye. Very many of their formations are similar in character to the wood-cut drawings of pathological and physiological representations illustrating the works and text books upon pathology and physiology, &c. In some instances this affection of the vision is of a character that the muscœ volitantes are unnoticed, because they are only visible against a bright clear blue sky, and these are reflected in the field of the microscope, (as are the others) where they are often mistaken or confounded with the object placed in the field of the object glass, hence producing many errors and misrepresentation.

The late Dr. Robert Nelson, the distinguished Surgeon of Montreal —Naturalist, Histologist and Microscopist, endorsing the views of this paper, aids us with the following anecdote : While in London, visiting an hospital distinguished for medicine and its anatomical and pathological museum, the doctor says : "It chanced that while I was going through the Anatomical Museum of ——— 's hospital, accompanied by Dr. C. (we will name him), who was the microscopist, etc., in charge of the Museum, and who was showing and describing the various pathological, microscopical and anatomical and other preparations, Dr. Bovine—we will name him—who had left a pathological specimen with Dr. C. for his microscopical examination, now called upon this great authority for his report. "This specimen," said Dr. C., "is the finest specimen of developed '*cancerous cell formation*' I have ever had brought under my notice during my examination of *cancerous tumors!* insomuch so, that I have made a colored drawing of it," handing Dr. Bovine the colored sketch. "From what particular case did you procure it?" Dr. Bovine, confused by the question, inarticulately mumbled something and got away. Dr. Bovine had brought a portion

of the heart of one of Prince Albert's prize beef. The heart was completely enveloped with fat, and the Doctor wished to ascertain whether this over-repletion in the ox had produced "fatty degeneracy in the substance of its heart!"

Dr. C. is the author of several important works on histology and microscopy, which are accepted text books, and of standard authority.

Micrography, or rather some microscopists, inform us that each corpuscle or cell is the matrix of red globules of the blood, and they proceed to find within the corpuscle nuclei, and within the nuclei nucleodi, and within these nuclei, again—

> The very fleas have smaller fleas
> And smaller fleas to bite 'em,
> And these fleas have lesser fleas,
> And so on, *ad infinitum.*

According to experimental analysis, each and every chemist varies his estimate of the elementary constituents of the blood, as they do those of the muscle, bone, the teeth, etc. It cannot be a matter of surprise, then, that discrepancies should exist and be demonstrated by microscopists. Lieuwenhoek says: "A thousand millions of blood globules are not larger than a grain of sand." *Haller*, who never could see globules in warm blooded animals, says: "In cold blooded animals the globules are $\frac{1}{3000}$ of an inch in diameter. In the warm blooded animals *Jurin* says $\frac{1}{3240}$; Lieuwenhoek's experiments revised, $\frac{1}{1940}$; *Wollaston*, $\frac{1}{5000}$; *Baues*; $\frac{1}{1700}$, *Kater*, $\frac{1}{4000}$; Pavosier, $\frac{1}{1500}$; others from $\frac{1}{7000}$ to $\frac{1}{1200}$. Mr. Gulliver estimates them to be $\frac{1}{12400}$, and diameter $\frac{1}{3200}$. The diameter of these particles is estimated by the subdivided scale of Kater, the micrometer of Wollaston, and the criometer of Young at $\frac{1}{6000}$, and by the common micrometer at $\frac{1}{1700}$ of an inch. This conveys exactly the same amount of information as if we were to inform the reader that Trinity Church steeple was found by trigonometrical measurement to be 250 feet high, but that by a common three foot rule its altitude was determined at 700 feet.

Some authors say that the globules of blood are of the same size in all animals; others, on the contrary, say that they differ in every animal, that each animal has it own special size and form. Some say they present an oval shape; others that they are round, and others that they are spherical solid and flattened; and others that they are hollow rings with holes in their centre; and others contend that the globule is a bladder which contains a certain number of smaller bladders or globules within, in the shape of thin, transparent, egg-like bodies; and

to complete this confusion worse confounded, of scientific incongruities, Majendie asserts that *he* "*never could discover anything but coloring matter partaking of all the various shapes described by the different authors* according as the *coloring matter* of the blood was placed in the field of the microscope.

Leaving chemico-microscopical Medical Jurisprudence, we subjoin a case of obstetrical scientific evidence.

Some years ago, a man—"doctor" *par excellence*—was placed on trial in our Court of Sessions, New York, for mal-practice. He had attended a case of parturition, and had by ignorance and violence brought down the womb while trying to bring away the child ; he then passed a napkin round the uterus, mistaking it for the placenta, to secure a solid purchase or hold, and then placed one foot against the bedstead, and the other against the body of the woman, and with main force and stupidity actually tore the womb from the body ; of course the woman died under the monstrous treatment.

The defence called a Professor of Obstetrics, who produced an imported female pelvis, a varnished skeleton, and on these dried bones gave a lecture before the court, to the prosecuting counsel and jury, upon the science of obstetrics generally, and parturition in particular, all of which justified the accused as having proceeded *secundem artem* throughout the poor woman's travail. Had the jury been comprised of ten millions of matrons, without a dissenting voice they would have convicted the ignorant monster. But a sapient judge and an indifferent prosecuting attorney allowed a stupid jury to acquit the man.

A short time after, a Portuguese was tried for murdering a woman. He ruptured the woman's uterus in a less cruel way, for his own amusement. He had no expert to convince the jury that the rupture was done scientifically. He was hanged.

The final trial of Stokes for the murder of Fisk exhibits an extraordinary as well as a novel mode of procedure in the science of Medical Jurisprudence, of the scientific incongruity of legal acumen offered and accepted. The previous trial of Stokes displays the evidence of distinguished surgeons, that Fisk's death resulted from a fatal pistol ball wound. Surgeons of equal status, on the contrary, gave testimony that his death resulted from the effects of opium improperly administered.

Fisk's body, technically, by virtue of the coroner's inquest, was in court for adjudication bearing upon the case connecting Stokes as being the cause of his death. The prosecution, sensible to the fact that the antagonistic character of the scientific evidence already received, could

not, by any legal affinity, be harmonized into a legal truth, ignored it altogether. The court, or prosecution, in this dilemma of how to arrive at the scientific facts of the question, seems to have adopted the plan of the learned chemical analyst engaged in demonstrating human blood, in the case of the poor Indian's trial, whose experiments, it will be remembered, discovered that the size of the corpuscles of the blood differed ; so, to surmount this difficulty he *averaged them* into an equalization. Somewhat after this manner, the court seems to have averaged the problem here presented in medico-surgical science in its connection with jurisprudence, by permitting the introduction of a *third*, or new order of experts, who give testimony *of their opinion only*, upon a proposed hypothetical body or "case," supposing it to have been prostrated by a gun shot wound, and *what would be the effect* of administering a supposed quantity of opium for the purpose of assuaging pain, and quieting supposed irritability, supposed to be causing nervous excitement, etc. All this is mere supposition, foreign to the body of Fisk and facts now the subject of investigation.

We have attended criminal and civil trials, too. On these occasions we have frequently heard counsel admonish witnesses thus : "I don't ask, nor do we want to know what your opinion is. Answer my questions as to facts of your own knowledge." But here we have gentlemen giving their opinion in a suppositional case, upon a body that never had even an imaginary existence until now, never had opium administered, nor had the experts ever seen "the case," and knew nothing about the opium that was never present, never existed, and was never administered. Nor was the case ever surgically or medically treated beyond this spirituality of their own imagination. Yet, with these nonentities of body, life, wound, opium, surgical and medical treatment—while the true legal facts of the case are before the court—this hypothetical scientific medico-surgical nonsense is accepted as scientific evidence in Medical Jurisprudence, and again, like the chemical analyst averaging the size of the blood, the jury, not to be behind-hand, averages the evidence and the guilt of the accused *in the third degree.* Extremes meet west and east, in the Indian's and Stokes' juries and trials.

Locke says, "An error is not better for being common, nor truth the worse for having lain neglected, and if it were put to the vote anywhere in the world, I doubt, as things are managed, whether truth would have the majority, at least, while the authority of men and not the examination of things, must be its measure."

In common with the millions of American citizens, we pride ourselves

in the belief that the Constitution and the common law secures to each and every individual, the right, when charged with offense against the commonweal, of having the indictment investigated and pronounced upon by twelve of his peers. Technically, this right is carried into effect ; but practically, when a person is charged with the crime of murder by administering poison, he is placed in eminent critical jeopardy of his life by the evidence of *one* person—an expert, whose opinion and judgment are engaged and extravagantly paid for by the prosecution to prove by his *sole* experiments the presence of a poison, or to decide upon the character of a few dark spots that science cannot demonstrate. The prosecuting chemist retains in his possession every particle of the supposed poisoned body. Thus, like Madame Lafarge, the poor gardener, and the friendless Indian, the accused is isolated, and powerless to make his investigations through the skill of *his* employed experts. Nor can he produce an expert who has had the opportunity of either overlooking or ascertaining the purity of the tests used, and their proper manipulation and correct application ; nor is the accused supplied with a portion of the supposed poisoned body, etc., that he, through his experts, may make an analysis in his own defence. He cannot have the opportunity of showing the impossibility of analyzing the dried spots of blood "boiled" or "soaked" from old clothing or scraped from a new wall, or from between new pine wood. He cannot show that substances not poisonous in themselves, by chemical change, form new and singular combinations with adulterated food and drugs; or show the fact that spirituous and malt beverages taken into the stomach, swell the bills of mortality ten thousand fold more than all the hypothetical malaria lines mapped upon our city charts.

These recorded cases which we have collected, though not all we could furnish, will serve to exhibit some of the characteristics of scientific evidence presented before courts of justice, expatiated upon, and elaborated by "learned" counsel and muddled into the brains of "patient," intelligent juries, who are about as capable of comprehending and understanding the technical, obscure, unintelligible chemical nomenclature (jargon to them), as they would be capable of explaining the solar system, the quadrant, the chronometer, or the formation of a table of logarithms. In short, the accused has no opportunity of securing for himself "a scientific" defense, a right to which he is as much entitled as he is to have a "legal defender."

The people, for the purpose of accomplishing even justice, no more and no less, and from a desire that justice be done alike to

themselves and to the accused, through their judicial representatives assign *legal* experts, or "counsel," to defend and protect those accused of high crimes against unnecessary subtleties and technicalities of evidence, &c. But while they employ a chemical expert to aid the prosecution with his chemical subtleties to condemn the accused, they do not assign an analytical expert to see that the *only analysis* made, jeopardizing his life, is done with *positive* correctness, and thereby protect him against the fallibilities of chemical, microscopic, and olfactory incongruities brought to bear to make up a case in Medical Jurisprudence. To expose these, the accused is entirely dependent upon the theoretical reading of his counsel, who, as a general rule, crams himself with chemical questions to meet the case, and with which he attempts the almost impossible task of "upsetting," or contradicting a well prepared self-interested expert upon his own experiments, who feels and knows, should he fail to establish their correctness, it would compromise him morally and scientifically forever.

It is very far from our intention to help to screen the guilty. Right is right, nothing less, and it is only justice that EXACT SCIENCE should be *positive* where life and liberty are at stake. Better that twenty guilty persons should escape, than that one innocent person should suffer.

We conclude our paper on the fallibilities of scientific evidence with the following (reported in the *Evening Post*) case tried in a civil court. Fortunately it involved money and the right to a trade-mark on mustard, and not the life of a man. The tilt between the two distinguished chemists not only illustrates our moral, but adorns the truth of our tale.

THE TESTIMONY OF EXPERTS AT FAULT.

The conflict of testimony between scientific men in judicial investigations has often been the subject of remark. A noted instance of such conflict is now presented in the Wharton murder trial. A striking instance of an unexpected source of error in scientific investigation was witnessed in the last case tried by Mr. Justice Jones, in the Superior Court in this city, being the case in which the house of J. & J. Colman established their right to a bull's head as their trade-mark on mustard. Professor Doremus, one of the most celebrated analytical chemists of New York, called by the defendants, had alleged as the result of his experiments, that mustard contained over eleven per cent. of starch.

Two other analytical chemists, one of them Professor Chandler, of Columbia College, alleged that mustard contained no starch. The evidence was in this conflicting condition when both parties rested, and

the case was adjourned until the next morning for argument. In the meantime, Professor Doremus applied to the counsel of the defendant to move to so far open the case as to allow him to vindicate by actual experiments in open court the correctness of his statement as to existence of starch in mustard. The motion was made and granted, and on the 5th December the court room presented the appearance of a chemical laboratory.

The Professor, with his assistant, prepared mustard for experiment in open court by pounding the seed in a mortar. He placed the crushed seed in distilled water, and boiled the mixture over a spirit lamp. He then threw some of the solution on sheets of filtering paper, applied his chemical tests, and exhibited to the court on the paper the characteristic blue iodide of starch. The experiment was varied in many ways with the same result, and at the end of the testimony many sheets of paper were thus colored. The demonstration seemed perfect. On Professor Chandler being called to the stand, he made experiments which in his view demonstrated that starch did not exist in mustard, and stated that he was not satisfied with the experiments that had been made by the defendant's witness.

"Why," said the defendant's counsel, "are you not satisfied with the reaction for starch exhibited by Dr. Doremus on the dozen or more sheets of filtering paper?"

"I am not certain, to begin with," said Professor Chandler, "that the paper would not have produced that reaction without the mustard." Whereupon the counsel handed to Dr. Chandler some of the clean paper, and asked him to apply the test to it himself. He did so, and the result was *a deep blue,* thus showing the illusory nature of the prior tests, and that the experiment was entirely worthless as proof that starch was contained in mustard.

"Now here was a chemist," says the *Post,* "of great learning and experience, pledging himself, under oath, to the presence of starch in mustard, exhibiting in the frankest way his experiments in open court and in the presence of eminent chemists, and producing as the result the characteristic blue which concededly demonstrated the presence of starch. If the question of life or death depended upon this testimony, could a jury have been in doubt? and yet by an oversight a vital element in the problem had been overlooked. The thing sought for was not in the substance analyzed, but in the paper on which, for convenience, it had been poured.

With the conclusion of our views upon the subject of Fallibilities of

Scientific Evidence, we adopt the principle expressed by the great surgeon *Abernethy*. "Whenever the opinions on subjects of importance which an attention to cases had impressed upon my mind, differed from those which seemed to prevail, I published the facts and the inferences I drew from them, because I thought at least they deserved attention, and that the latter would either be confirmed or confuted by general experience of practical truth."

"MAKING THE DUMB TO SPEAK."

On visiting an institution in London for the education of the deaf and dumb, my first sensation was one of surprise. Entering a room filled with children, I exclaimed : "They are not deaf!" "Yes, they are," replied the Superintendent, who accompanied me, and turning towards the children, he inquired, "Are you not all deaf?" There was a general cry of "Yes." "Then they are not dumb!" The answer was that they were all supposed to be deaf and dumb. I confessed myself fairly puzzled. I was prepared for any amount of skill and rapidity in speaking on the fingers, and I knew that there was a "sign-language" in use among the deaf and dumb, which has been brought to wonderful perfection ; but making the dumb to speak with their own tongues I had hitherto thought was one of the attributes of a more than human power. I was wrong. The system by which the dumb are actually taught to speak with their own tongues is not new among ourselves, though it, for good reason, languished in England until some four or five years ago ; but in Germany it has been in general use for a long time past, and has been attended with marked success. The principle on which it is based is a very intelligible one.

In deaf mutes the dumbness proceeds from the deafness. A child born deaf does not speak, because it cannot acquire speech in the ordinary manner—that is, by hearing others speak, and imitating them. Thus the real defect is deafness, though the effect is very generally mistaken for the cause, and there is a common complaint about the dumbness, while the deafness which really causes it is unheeded. The system consists in making the eye supply the place of the ear. Just as in persons born blind the sense of hearing is developed with extraordinary intensity, so it has been found that in the case of those who are born deaf the sense of sight can be cultivated till it becomes extremely acute ; and by watching the lips and countenance of those who speak

to them the persons deprived of hearing can gradually be taught to understand, by the eye, what is said. This artificial mode of hearing is called "lip-reading." It is said to have been invented by a Spaniard nearly three hundred years ago; but his invention was not for a long time turned to account in the treatment of the deaf and dumb. Various other plans have been resorted to. Attempts were made in different countries to remedy some supposed defect in the organs of speech by surgical operations. It was thought to loosen the tongue of the dumb by cutting the ligaments underneath—a process by which these unfortunate creatures were put to unnecessary torture, and in most cases the organs of speech were mutilated, so that, instead of relief being afforded, positive injury was inflicted. The organs of speech in deaf mutes are generally quite normal. About the end of the seventeenth century, a Swiss physician named Amman settled at Amsterdam, and commenced practicing the lip reading system, by teaching his pupils to watch attentively with their eyes the changes which came over his countenance and his lips as he uttered words, and then to imitate these changes themselves before a mirror. He met with great success in Holland; and after his death the system was introduced into Germany. In that country it has been developed and brought to great perfection during the last hundred years; and it is a Dutchman, Mr. Van Praagh, who has chiefly advocated and practiced in England that system solely for some five years past. While in Germany all the institutions for deaf and dumb have been conducted on this principle, and its success has been generally acknowledged, we have been in England content to combine it, to a comparatively small extent, with what is popularly called "finger-talking," or the "sign language." This last was originated in France by the Abbé de l'Epée, who conceived the idea of creating a means of intercourse through the medium of signs and gestures. He compiled a complete vocabulary of these signs, and his system was carried to great perfection in France. It was imported into this country; and among other institutions where it is in use, it has been practiced with considerable success at the Institution for the Deaf and Dumb in the Old Kent Road. But both this and the finger-talking have some radical defects: 1. The sign-language varies at different institutions, and therefore cannot become a common means of communication. 2. Any such language consisting of arbitrary signs is only of use among the deaf and dumb themselves, and can never be a medium of communicating to any extent with the outer world. 3. By not using the organs of speech they become gradually weaker for want

of exercise, and in a large number of cases the health is thereby injured. Statistics inform us that a very large proportion of deaf mutes taught sign-language die of consumption.

The lip-reading has, as we have said, for its champion in this country, Mr. Van Praagh, who at first taught it in a Home for the Deaf and Dumb, established by the Jews in Burton Crescent. He has since founded a larger institution (open to all sects) upon the same system in Fitzroy Square. It was at a first visit to the Jews' Home that my astonishment at the successful results which I witnessed found vent in the exclamations I have quoted above. The director then proceeded to show me the working of the system. For this purpose two little girls, about twelve years of age, were called up; and placing himself opposite to them, he began to question them, speaking in an ordinary tone of voice, but slower, and with rather more emphasis than one would use in common conversation. The children fixed their eyes intently on his face, and answered immediately and correctly to everything which he asked.

The articulation was peculiar, and somewhat labored, but not disagreeable, though they spoke in the monotonous tone of those who are making use of a language which is not their own. Lest I should think that the questions which he put to them were prepared beforehand, the director then invited me to speak to them myself on any subject which I chose, only reminding me that I must speak slowly. Accordingly, I did so; and found that, with the exception of one or two words, they understood everything I said, and answered correctly. It was then proposed that I should dictate something to them. A black-board was set up, and a piece of chalk put into their hands, and I slowly repeated several sentences on different subjects, just as they came into my head. The girls wrote them down as I uttered them, without misspelling a single word. I inquired whether they understood the precise meaning of all the words which they wrote down, or whether they might not be familiar with the sounds and spelling without comprehending their import. To satisfy my skepticism on this point, I was bidden to select some word. I pointed to the word "newspaper," which occurred in one of the sentences which I had dictated. "Go down stairs to my room," said the director, addressing one of the girls, "and bring me up the newspaper which is there." Instantly she started off, and returned in a few minutes with the *Times*—thus giving an effective answer to my doubt. These were, of course, some of the most advanced pupils in the school; and in answer to my inquiries I was informed that they

had been under teaching for about eighteen months; but in order that I might thoroughly understand the process, it was necessary for me to see how the beginners are taught. A class was therefore formed of the youngest children, from six to eight years old, some of whom had only been a few days in the school. It will be remembered there are two distinct steps in this system. First, the sense of hearing has to be supplied by the eye, the pupil gathering from the lips and countenance of the teacher what he says; secondly, the pupil, by imitating the actions and expressions which he sees, produces the same sounds, and thus unconsciously learns to speak.

The teacher placed himself in front of the class, and proceeded first to engage their attention by speaking to one of the elder and more advanced pupils. The other children soon perceived that, as the teacher's lips moved, the listener turned round and looked at him, and they in their turn fixed their eyes attentively on him. He then began slowly to make the simple vowel sounds, a, e, i, o, u; and after watching the movement of his lips for some time, the children began to imitate it themselves, emitting more or less correctly the same sounds. Then, as they learned to sound each letter, it was written down before them on the black-board, and they were shown how to form it for themselves—a comparatively easy process. Thus they came, in a surprisingly short time, first to recognize the letter when spoken by the teacher; secondly, to sound it themselves; thirdly, to recognize it when written; fourthly, to write it themselves. Having witnessed these elementary steps in the teaching for myself, I was informed that the consonants are next taught in the same manner, commencing with the labials, which are the easiest to form—m, p, b, etc.; then the gutturals and other consonants; next the two sounds, vowel and consonants, thus learned, are joined together in some of the simplest one-syllable words—such as boy, cat, dog, etc.—and the learners are shown the objects to which they refer, or representations of them in a picture. Thus they are made familiar with the meanings of the words which they utter, and, as with the letters, the words are written down as they are learned. Such is the simple system by which deaf mutes are taught to speak. It is based upon the principle that speech in all human beings is acquired by imitation only. From this imitation, in the usual way, those born deaf are cut off by their loss of hearing; but the failure of this sense can be compensated, and its place supplied by careful cultivation of another—the sense of sight.—*Chambers' Journal.*

A HAIRY FACED FAMILY.

Mr. W. B. Tegetmeier, a well known English naturalist, publishes in a contemporay the portraits of three members of a Burmese family, the whole of which, through several generations, have exhibited a remarkable development of long hair over their entire faces.

"The case," says Mr. Tegetmeier, "is one of the most interesting examples on record of the hereditary transmission of a singular and very abnormal natural variation through several generations. I feel bound, even at the risk of repeating, to some extent, the previous statements, to give, as far as practicable, the history of those singular people at length. Nearly fifty years since, Mr. John Crawford, so well known to ethnologists for his researches in the history of languages of the inhabitants of the Malay peninsula and adjacent countries, described, in his 'Journal of an Embassy from the Governor-General of India to the court of Ava,' a hairy man, named Shwe-Maon, and his daughter, Maphoon. Mr. Crawford wrote: 'We have heard much of a person said to be covered all over with hair, and who, it was insisted upon, more resembled an ape than a human being—a description, however, I am glad to say, which was by no means realized by his appearance. Having expressed a curiosity to see this individual, the king politely sent him over to our dwelling some days ago, and Dr. Wallich and I took down on the spot the following account of himself and his history. His name was Shwe-Maon, and he stated himself to be thirty years of age. Saubwa, as the chief of the country, presented him to the king as a curiosity when a child of five years of age, and he had remained in Ava ever since. His height was five feet three and a half inches, which is about the ordinary stature of the Burmese. His form was slender, if compared with the usually robust make of the Hindoo-Chinese race, and his constitution was rather delicate. In his complexion there was nothing remarkable, although upon the whole he was rather fairer than the ordinary run of Burmese. The color of his eyes was a dark brown, not so intense as that of the ordinary Burmese. The same thing may be said of the hair of the head, which was also a little finer in texture, and less copious. The whole forehead, the cheeks, the eyelids, the nose, including a portion of the inside, the chin—in short, the whole face, with the exception of the red portion of the lips, were covered with a fine hair. On the forehead and cheeks this was eight inches long, and on the nose and chin about four inches. In color it was of a silvery gray; its texture was silky,

lank, and straight. The posterior and inferior surface of the ears, with the inside of the external ear, were completely covered with hair of the same description as that on the face, and about eight inches long; it was this chiefly which contributed to give his whole appearance, at first sight, an unnatural and almost inhuman aspect. He may be strictly said to have neither eyelashes, eyebrows, nor beard, or at least they were supplanted by the same silky hair which enveloped the whole face. He stated that when a child the whole of this singular covering was much fairer than at present. The whole body, with the exception of the hands and feet, was covered with hair of the same texture and color as that now described, but generally abundant; it was most plentiful over the spine and shoulders, where it was five inches long; over the breast it was about four inches; it was most scanty on the bare arms, the legs, thighs, and abdomen. We thought it not improbable that this singular integument might be periodically or occasionally shed, and inquired, but there was no ground for this surmise—it was quite permanent.'

Twenty years since, these hairy people were seen and described by Capt. H. Youle, in his 'Narrative of the Mission sent by the Governor-General of India to the Court of Ava.' By this time Shwe-Maon's child had grown into a woman of thirty, and the abnormal growth of hair had increased until it covered the whole body. Capt. Youle states:

'The whole of her face was more or less covered with hair. On a part of the cheek, and between the nose and mouth, this was confined to a short down, but over all the rest of the face was a thick, silky hair of a brown color, paleing about the nose and chin, four or five inches long. At the alæ of the nose, under the eye, and on the cheek bone, this was very fully developed; but it was in and on the ear that it was most extraordinary. Except the upper tip, no part of the ear was visible. All the rest was filled and veiled with a large mass of silky hair, growing apparently out of every part of the external organ, and hanging a pendant lock to a length of eight or ten inches. The hair over her forehead was brushed so as to blend with the hair of the head, the latter being dressed (as usual with her countrywomen) *à la Chinoise.* It was not so thick as to conceal her forehead.

'The nose densely covered with hair, as no animal's is that I know of, and with long locks curving out and pendant, like the wisps of a fine Skye terrier's coat, had a most strange appearance. The beard was pale in color, and about four inches in length, seemingly very soft and silky.

'Poor Maphoon's manners were good and modest, her voice soft and feminine, and her expression mild and not unpleasing, after the first instinctive repulsion was overcome. Her appearance rather suggested the idea of a pleasant-looking woman masquerading, than that of anything brutal. This discrimination was, however, very difficult to preserve in sketching her likeness.

'Her neck, bosom, and arms appeared to be covered with a fine pale down, scarcely visible in some lights. She made a move as if to take off her upper clothing, but reluctantly, and we prevented it. Her husband and two boys accompanied her. The elder boy, about four or five years old, had nothing abnormal about him. The youngest, who was fourteen months old, and still at the breast, was evidently taking after his mother. There was little hair on the head, but the child's ear was full of long silky floss, and it could boast a moustache and beard of pale silky down that would have cheered the heart of many a cornet. In fact, the appearance of the child agrees almost exactly with what Mr. Crawford says of Maphoon herself as an infant.

'This child is thus the third in descent exhibiting this strange peculiarity; and in this third generation, as in the two preceding, this peculiarity has appeared only in one individual.

'Maphoon has the same dental peculiarity also that her father had —the absence of the canine teeth and grinders, the back part of the gums presenting merely a hard ridge. Still she chews pawn like her neighbors.'

Six or seven years since the family were again seen by Capt. Haughton, and photographed. By this time Maphoon's youngest child was approaching manhood, and, the early indications above alluded to having been fulfilled, he demonstrated the perpetuation of this singular variation through three generations.

The investigation of monstrosities of the kind at present under consideration has an interest beyond that of the gratification of mere vulgar curiosity. The hereditary transmission of accidental variations throws much light on the vexed question of the origin of species, and it is exceedingly interesting to note how readily variations, occuring naturally, are perpetuated in the offspring, while malformations or mutilations produced artificially never show any tendency to reproduction. The combs and wattles of game fowls have been cut off for one hundred and fifty generations, yet a game cock ready dubbed for the cockpit never issued from an egg. It would be indeed a sad condition of things if the mutilations of mankind were inherited by the unfortu-

nate children. We know, unhappily, that the constitutional defects of the drunkard and the debauchee descend to their offspring, and that in this manner 'the sins of the fathers are visited on the children even unto the third and fourth generations;' but, fortunately, we are exempted from the inheritance of accidental mutilations and losses."

OUR LONDON LETTER.

London, January 15th, 1875.

During a recent visit to Paris I was considerably amused by seeing a case of dental specimen pieces exhibited in a butcher's shop-window. This enterprising practitioner had evidently a keen eye to the fitness of things, and saw the close relation between a succulent "bef tik" and the means of mastication. Of course one cannot say so much for his views on the dignity of his profession. Still, as we know the difficulty of consistency all round, we must make some allowance in this instance.

It occurred to me that the "American Dental Society of Europe," the object of which is the sublime task of establishing the dental profession in Europe "on the same grade as a liberal and learned profession, which it holds in the United States" has some rather up-hill work before it, particularly if it meet with such clever opponents as the proprietor of the butcher shop case is likely to be. We benighted Europeans are of course duly grateful to these gentlemen for their disinterested efforts in our behalf, but if these gentlemen pay much attention to the dental literature of their own country, and lay to heart the discussions which take place there on the subject of dental education, and the social status of dentists, it seems to me that they might be a little more modest in the position which they arrogate to themselves, even though the extent of the field of their labor does not seem to appall them. Still, it is easier to give a name than make a reality, as is exemplified by at least one member of the Society whose title to Doctorship is rather difficult to find. Still, we must not allow such trifles to stand in the way of the elevation of degraded European dentists. Perhaps these gentlemen do not attend much to the dental literature of their country. If not, I would suggest their immediate attention to the faithful reports given in their journals, of the proceedings in American conventions. They will then see the condition of the pro-

fession there, and the difficulties with which the advanced members of the profession have to contend in their efforts to move, be it ever so little, in an upward direction. They may also learn that charity is not the only thing which may, with advantage, begin at home. We in Europe have our own battles to fight, and must fight them in our own way; and strangers who are not subjected to the same influences as ourselves, and who have not the same surrounding obligations, are hardly the men to lead us in the matter. We acknowledge now, as always, the way in which America has led in the diffusion of professional information, and the proficiency and ingenuity of many of her practitioners, and we shall ever be grateful for the lesson she has shown us; but when ten or twelve expatriated practitioners set themselves up as the luminaries of a whole Continent, their lunar light is more likely to excite our ridicule than our admiration.

The Dental Hospital of London has, as you are perhaps aware, lately adopted the plan followed in your schools, of receiving payment for the gold used in plugs. The official report has not yet been published, but the plan is believed to have acted well. The number of gold stoppings done last year, the business of which was interrupted by removal, is 1,219. Tin foil, 766, out of a total of 3,429. The total number of patients is 17,580. There were 12,303 extractions performed. Of these, 2,354 were under the Nitrous Oxide Gas. So you see we make some progress in education here, at least so far as practice goes.

The Annual Meeting of the Odontological Society of London was held last Monday night. The progress of the Society was highly satisfactory, although much yet remains to be done to bring men into its fold. The President had to express his regret for the loss of two of our members, Dr. Hitchcock, of Boston, and Dr. Parmley, of New York—gentlemen, said the President, who had spent their lives in devotion to their profession.

I see by files received, that the Odontological Society of New York has been having a grand time of it lately. What a pity it seems that so much matter should be poured out in a flood. To us at a distance, it seems better that such a Society should meet at regular intervals, and so have more time to consider each subject, and also, by the steady pressure of its existence, exercise a healthy influence on the whole profession. It must be high-pressure work for the New York committee to get the thing up, and those spasmodic efforts take it out of those who have to make them to a dangerous extent, while their influence

is likely to die away on all excepting those who need it least. Of course you have your difficulties to contend with, which an outsider cannot understand; still, the result of the monthly meeting of the Odontological Society here has been highly beneficial, and although it is tolerably well established now, it has yet much to do, and it was a very delicate weakling at its commencement, and had to gasp for existence amidst a storm of opposition—say nothing of neglect.

I noticed in one of your journals some time ago, that the chairman of one of your Societies was presented with a gold watch. I meant to have asked some information on the subject in my last, but the sad nature of the matter I wrote about, shut this less important subject out.

When a presentation is made here, it is usual to publish the list of subscribers; and although at first sight this may seem ostentatious, yet, on closer examination, it has some good features about it. Of course no gentleman is ashamed of what he is able to give, neither would gentlemen judge of him by the amount of his subscription; but when the sum is put down opposite the name, it shows the receiver who are those who think so highly of him, and it shows the subscribers what has been done with the money. I know an instance of a parson who had a presentation of plate from some of his parishioners. As it was a hole-and-corner affair, there was no list of subscribers, but if there had been, the reverend gentleman could not have paid for the plate himself, and got up a sham, or, as you would say, a bogus presentation.

I hope that none of your Associations will ever degenerate into mutual admiration societies. I hope also 1875 will see the dentists of America more advanced, more enlightened, more united, wealthier and wiser than they have ever been before. With New Year greetings, a wish which I hope is reciprocated by many of your number for their brethren here,

I remain, as before,

VAGRANT.

THE *American Textile Manufacturer* says that the simplest and surest process for extracting oil spots, is to saturate the spot with benzine, then place two pieces of very soft blotting-paper under and two upon it, and press well; in some cases a hot iron is necessary; in others a high pressure, say 100 lbs. per inch without heat is sufficient. By this means the fat is dissolved and entirely absorbed by the paper. To rub the oil spot with a sponge saturated with turpentine or benzine only spreads the grease.

CANDY: ITS EFFECT ON THE TEETH AND SYSTEM.

Read before the New York Odontological Society, by JOHN T. CODMAN, D.M.D., Boston.

What question oftener asked the dentist, than, Is candy injurious to the teeth? As a profession are we agreed as to our answer to that question?

Undoubtedly sugar candy has a direct and an indirect action on these important organs, and the question, as it is generally asked, refers to its direct action, and is answered by the dentist that it has no directly unfavorable action; that sugar is preservative or antiseptic, and cannot produce decay; that a tooth placed in a saturated solution of sugar can be kept for any length of time unchanged.

Now this answer, though correct as regards sugar, I am not sure would apply to all the various compounds of sugar and chemicals that are eaten and classed under the name of sugar candy.

It is painful to read the loosely written articles that are circulating in the newspapers and periodicals, and notice the effect on the public mind, of articles thus written in praise of sweets and candies.

It is consoling to know that our people are such eager readers and seekers after truth, but sad to see how readily any such article, going against the better judgment of their minds, is swallowed by people of good sense, if the name of the much abused science of chemistry is coupled with it.

Chemistry, says a newspaper article, proves that 'sugar is very nourishing, and it can be no harm to eat it freely; it is fattening, etc. Nature dictates it, and children love it—give it to them, it will do no harm."

The great preacher of our country reads the article, and in print he commends the stick of candy—the rod was good for Solomon's boys, but the stick of candy for Young America. And the dear good doctors —I state facts—recommend on the sick bed, that the sick boy should have a piece of candy instead of the Indian gruel and the dry toast of our forefathers.

I admire progress, I believe in it with my whole heart—progress in religion, in medicine, in dentistry, and in all the arts and sciences of life. All these things have I believed in, "from my youth up," but let not our progress be like the crab's, sidewise or backward.

I am not a confectioner, nor am I versed in the various manipulations by which all the changes are wrought in sugar, to make it attract-

ive to children—those of an "older growth" included; but I know that there are chemicals used in its manufacture that are in themselves destructive to the teeth, such as the acids that are used in the preparation of acid and lemon drops, and other varieties of candies. "It needs no ghost come from the grave to tell us that," say you. Their very names indicate that they are *acid* compounds. *We* don't buy those candies, *we* only let *our* children have "plain molasses." Let us see how plain molasses candy is made. After the molasses is boiled sufficiently, a certain percentage of soda or saleratus is put into it, and then an acid, a certain percentage to the quantity of molasses used. Any of the ordinary acids produces the effect which is wanted, effervesence—the contact of acid and alkali filling the candy with bubbles of the generated gas, making the candy "light."

By what I have stated, you have anticipated my argument that candy is oftentimes, by its *direct* action, injurious to the teeth, perhaps not much so to perfect teeth, used in small quantities, but the present generation, I am convinced, have in the main imperfect teeth—teeth imperfectly formed, with fissures in them, into which acids and fluids penetrate, and which is the ground-work of the decaying tendency of our times.

To return to my text, Is candy injurious to the teeth? Most certainly it is. For outward proof of it I will refer you to any candy-making village in our country, as the village of Neponset, Mass., where the shocking condition of the teeth of the youth, brought up in proximity to large candy manufactories, shows plainly the cause. But this is perhaps negative proof, and we should seek for proof positive, because other causes than those of the use of candy may be the reason, in this instance, of the disease.

Another proof, though not proof positive, is in the general belief of its injury. What everybody says must be true, is an old proverb, which, like most proverbs, needs to be qualified, but applies well to the very general impression in the public mind regarding the use of confectionery. The impression is so general, that it would take a large amount of science and education of the people to convince them to the contrary—such impressions, though oftentimes faulty, generally contain a basis of truth.

But by far the most injurious consequences in the use of candy, is in its indirect action through the system, first by its constituents, second by its disturbing action; or first by its constitutional action, and second by its physiological action, if I rightly comprehend the meaning of those terms.

It is primarily necessary to understand that everything taken into the human system *has* an action, and that action either accelerates or retards the primary physiological motions. There can be nothing taken into the system through the mouth and stomach, but has its *individual* action on all the tissues it comes in contact with, and more especially on the motions of the great alimentary canal, which may be considered to commence at the mouth, as its primary orifice. So intimate is this canal in relation to its whole, that even the presence of a disagreeable or nauseating substance produces an action from contact with the mouth alone, which often extends to the stomach and through the entire length of this long intestinal tube.

The motions of this great organ, so feebly understood by physiologists and by the medical fraternity, are, to my apprehension, as deep and as primal as those of the heart, and have as distinct a pulsatory and primal motion ; or I may say that it has two motions, which, under healthy conditions, balance each other as the dual laws or motions of the planets. We learned in our schoolboy days that the centrifugal motion of the earth made it tend to fly off into space, to the danger of its annihilation, but by the centripetal motion it was brought to its proper revolution around the sun ; but if the law of centrifugal motion was relaxed we should as surely be demolished by being drawn into the blazing orb, the sun, and burned up—a condition of things not very soothing to childish minds.

Now the two laws or conditions of the alimentary canal remind me of the higher laws of the planets. The first condition or tendency may be said to be towards constipation or contraction of the walls of the canal, and the second a relaxation of the walls, either of which, in its extreme, is death.

Between these two extremes lies every variety of condition, perfect when the two tendencies balance each other, and imperfect when they do not.

These explanations are necessary before presenting to you some further remarks on the relation of the confectionery of the present day to the dental organs ; for if every article of food produces some individual action or difference of condition in the intestinal tube, how easy is it to assume that an article of so much effect on the organs of taste as sugar candies, should have a marked effect on the condition of the alimentary tube.

By long research I have discovered that the effect of the use of cane sugar, in small or in large quantity, is to produce a more or less consti-

pated state of the alimentary canal, more particularly the refined sugar of the present day.

If, then, the *balance* of intestinal action is normally correct, the presence of sugar always disturbs it. But other causes come in to produce bad results—with the normal condition of the stomach a certain amount of digestive fluid, distinctly acid, as the books tell us, is poured into it, more especially when the process of the reception of food is going on.

This acid fluid is neutralized by the sugar taken in; either a larger supply of digestive fluid must be created or secreted than usual, or digestion is considerably retarded.

With a normal condition of the stomach and alimentary canal, food is not retained in the stomach a great while, but is rejected and passed into the alimentary canal; but unless there is vigorous digestion, and active motion in the canal, which means little or no contraction from its free and normal condition, this sugary compound remains upon the stomach until *chemical* action takes place, which results in fermentation, and is quickly followed by the presence of a large quantity of acid, the result of the decomposition of the food. This acid, if not disposed of by digestion, must be absorbed in some way. I have the belief that it is distributed through the fluids of the body, more particularly those fluids that are not connected immediately with the vital system, as the blood, but is carried into the perspiration, and also into the saliva.

I shall not be dogmatic enough to say that this is so, but I have many reasons for thinking so, and I believe that science will bear me out in it: thus, the presence of a large amount of concentrated acid in the stomach, (and its tendency is to concentrate,) produces a large quantity of acid in the saliva; and in short this is the reason of the indirect action of sugar candies on the teeth—the most dangerous of actions, because so little suspected by the generality of persons.

There is a point that may be stated here, and I wonder that no attention has ever been paid to it; and that is, the action of sugar on an exposed nerve. We eat bread, meat, vegetables, and our "exposed nerve" makes no complaint, but the moment a little sugar is dissolved in the tooth, the tissue sets up a cry. What does it mean? Does it mean that it dislikes it—that it is discordant to the system? Does it mean that it is injurious to the fleshy or to the bony substances, or both? I have as yet not solved the problem. Who will do it? By analogy we must conclude that cane sugar is injurious, and yet there may be other reasons and other causes for the pain produced in the tooth.

I have touched on what I consider the constitutional action of sugar on the physical system, and as yet have spoken but little of the ingredients of the candies of the present day. Besides the sugar contained in them, and the coloring matters, mostly made of tincture of cochineal, which is harmless, are occasionally of other material, such as pigments of green and yellow, which are always, to the best of my knowledge, poisonous.

We have a large number of essential oils, or medicaments, every one of which has a peculiar medical effect on the system, toning it up or down, binding up its parieties or loosening them, and to these medical effects much of the injury of the confectionery of the present times is due.

A small catalogue of these essential oils and flavors may be interesting:

Group No. 1.—Peppermint, Checkerberry, Sassafras, Lemon, Clove, Anise, Cassia or Cinnamon, Vanilla, Rose, Caraway, Coriander, Cayenne.

Group No. 2.—Jargonelle Pear, Strawberry, Pineapple, Banana, Peach, Almond.

Group No. 3.—Boneset, Licorice, Horehound, Ginger, Cardamom, Chocolate, Butter, Cocoanut, Cordial, Brandy, Gum Arabic, Acids.

In purchasing a pound of mixed candies, you may perchance get all of these flavors in one lot.

Now I do not pretend to say that one is likely to be poisoned by such a compound, but I do say that when a mother gives a three year old child an ounce of peppermint drops to eat, she should know the effect of them when eaten—that she ought to know she is giving the child a strong medicament as well as an ounce of sugar; she ought to think and be taught that the effect of the oil of peppermint is definite, and that an ounce of peppermint drops will, if they are strong—and of course they are supposed to be good only as they are strong—contract the walls of the stomach and the small intestines, producing in a young child sometimes a spasm and inflammation, shown by a thirst for water, and a general disturbance of healthy action.

Such is, I believe, the general action of the essential oils of confectionery in group No. 1. The oil of cassia or cinnamon is very irritating. The oil of cloves is considered by many as destructive or poisonous. As a rule, the essential oils retard digestive action in the same manner that they preserve from decay meats and fruits, by retarding fermentation, or making compounds with digestible or decaying substances.

The pear and similar flavors in group No. 2 are imitations; they are chemical flavors, and are decidedly unhealthy. The composition of them I have found to be as follows:

The jargonelle pear flavor is made of the acetate of amylic ether, which is prepared by distilling a mixture of fusel oil, acetate of potash, and concentrated sulphuric acid.

The pineapple is made from butyric ether dissolved in another portion of alcohol. Butyric acid is made from decaying cheese, grape sugar, and chalk, fermented together.

Various mixtures of the ethers, with addition of various agents, such as acetic acid, camphor, orris, vanilla, the volatile oils, etc., result in imitations of the strawberry, raspberry, apricot, currant, etc., etc.

The tonka bean is used very much in place of the vanilla pod, to imitate the vanilla flavor.

The common oil of almond (bitter) always contains a considerable amount of prussic acid; this oil is said to be substituted sometimes by the oil of mirbane or nitro-benzole, eight or nine drops of which is said to have produced death.—*(Report of the State Board of Health of Mass. Vol. 4. 1873—p. 146 to 174.)*

The peach and almond flavors are also imitations made from prussic acid in some form, and are very poisonous.

The third group contains medicinal flavors: licorice, boneset, or horehound, ginger, cardamom, all of which have a different action from the first group, being relaxants and diuratives, and will have that effect in greater or less degree.

There are other varieties of which we will not here speak; but we must condemn the spirituous drops sold at the street corners, as decidedly impolitic and demoralizing to the little ones who may be tempted to buy them.

But the injurious effects of candies do not stop here. The *pure* essential oils are costly and are increasing in price yearly; substitutes must be found, adulterations are practiced, and among the most common is the adulteration of oil of peppermint with spirits of turpentine, a thing to be utterly condemned, especially as its action is with exceptional persons or in exceptional cases a very violent and dangerous poison, and in all cases is an irritating oil, producing congestion of the veins and coagulation of the blood (a useful styptic in cases of excessive bleeding, by the way,) and yet I am informed it is used by the confectioner himself, and only with a rule to put in as much as he can disguise or cover up.

The use of laudanum in licorice cough drops should be condemned.

Many a child has been injured by them without the knowledge of what was going wrong.

The lemon drops are supposed to be made of citric acid, and flavored with oil of lemon, but why citric acid, when oil of vitriol is so much cheaper; I have reason to believe, however, that tartaric acid is most generally used.

But why cry down candy, the pleasant pacifier, that which fills the sweet tooth of the rising generation? Almost every one likes candy—a little of it now and then—almonds, sugar-plums, gum-drops, (now made to a great extent of glue.) I do not cry it down, but must raise my voice against its excessive use, and ask whence comes the tendency, the appetite, for so much sweet. It seems to me to be occasioned by the great and increasing use of sugar in the family at home.

That which in the past was a luxury, is now supposed to be a necessity. We have toned up our appetites until our viands are tasteless unless they are sweet with cane sugar. We daily spoil the flavor that God has placed in our food, by adding our own product to it.

If we wish to eradicate from our youth the very strong tendency towards high seasoning or high sweetening, we must begin at home, and tone down instead of toning up, and teach ourselves and our children to love the inherent flavors of the grains, the fruits and vegetables; and as we and our children cultivate a love for them, so will their tastes grow, until this excessive sweetness will bear disgust, and their appetites will turn away from what cloys and sickens, and disturbs the normal condition of the human body.

I should refer to the use of an article to adulterate sugar, called *terra-alba*—a white earthy substance—quite harmless, being sulphate of gypsum (anhydrous calcic sulphate)—profitable to increase the weight without being suspected by the buyer. It is said to be used in large quantities. It can be easily found by dissolving the candy in water; if any sediment remains, it is likely to be terra-alba, or perhaps chalk, which is also used.

FORMULA FOR BLEACHING SPONGES.

Remove the sand by shaking; wash the sponges in hot water, and press as dry as possible. Then place in a bath of dilute muriatic acid for half an hour, remove, and, after washing well in hot water, place in a bath of fresh acid, to which has been added six per cent. of hyposulphite of soda, and allow it to remain for twenty-four hours. The sponge is then finished by washing in water and drying.

THE SCRIPTURE OF SCIENCE.

The Cincinnati *Commercial* publishes the following very clever satire on the teachings of modern scientists, which is presented in the shape of a chapter of scripture according to Tyndall, Huxley, Spencer and Darwin :

GENESIS, CHAPTER I.

1. Primarly the Unknowable moved upon cosmos and evolved protoplasm.

2. And protoplasm was inorganic and undifferentiated, containing all things in potential energy; and a spirit of evolution moved upon the fluid mass.

3. And the Unknowable said, Let aloms attract; and their contact begat light, heat and electricity.

4. And the Unconditioned differentiated the atoms, each after its kind; and their combination begat rock, air and water.

5. And there went out a spirit of evolution from the Unconditioned, and working in protoplasm, by accretion and absorption produced the organic cell.

6. And cell by nutrition evolved primordial germ, and germ developed protogene, and protogene begat eozoon, and eozoon begat monad, and monad begat animalculæ.

7. And animalculæ begat ephemera; then began creeping things to multiply on the face of the earth.

8. And earthy atom in vegetable protoplasm begat the molecule, and thence came all grass and every herb in the earth.

9. And animalculæ in the water evolved fins, tails, claws and scales; and in the air wings and beaks; and on the land they sprouted such organs as were necessary as played upon by the environment.

10. And by accretion and absorption came the radiata and mollusca, and mollusca begat articulata, and articulata begat vertebrata.

11. Now these are the generation of the higher vertebrata, in the cosmic period that the Unknowable evoluted the bipedal mammalia.

12. And every man of the earth, while he was yet a monkey, and the horse while he was a hipparion, and the hipparion before he was an oredon.

13. Out of the ascidian came the amphibian and begat the pentadactyle, and the pentadactyle by inheritance and selection produced the hylobate, from which are the simiadæ in their tribes.

14. And out of the simiadæ the lemur prevailed above his fellows and produced the platyrhine monkey.

15. And the platyrhine begat the catarrhine, and the catarrhine monkey begat the anthropoid ape, and the ape begat the longimanous orang, and the orang begat the chimpanzee, and the chimpanzee evoluted the what-is-it.

16. And the what-is-it went into the land of Nod and took him a wife of the longimanous gibbbons.

17. And in process of the cosmic period were born unto them and their children the anthropomorphic primordial types.

18. The homunculus, the prognathus, the troglodyte, the antochton, the terragen—these are the generations of primeval man.

19. And the primeval man was naked and not ashamed, but lived in quadrumanous innocence, and struggled mightily to harmonize with the environments.

20. And by inheritance and natural selection did he progress from the stable and homogeneous to the complex and heterogenous—for the weakest died and the strongest grew and multiplied.

21. And man grew a thumb for that he had need of it, and developed capacities for prey.

22. For, behold, the swiftest men caught the most animals, and the swiftest animals got away from the most men; wherefore the slow animals were eaten and the slow men starved to death.

23. And as types were differentiated the weaker types continually disappeared.

24. And the earth was filled with violence; for man strove with man, and tribe with tribe, whereby they killed off the weak and foolish and secured the survival of the fittest.

FAILURE.

By W. Irving Thayer, D.D.S., Brooklyn, N. Y.

What is a *failure?* Webster says it's "*a failing; deficience; cessation of supply;*" mark this, "*a total defeat;*" let me repeat it, "*a total defeat.*"

2. "*Omission; non-performance;*" the last is good, but hear him again; "*a man's (dentist's) failure in the execution of a trust.*"

Now, since there can be no mistake in our understanding of the meaning of *failure,* let us see if it is applicable to a practitioner of dentistry.

Now I plead *guilty.* Yet if I am not without fault, I'll "cast," not

perhaps the "first," but, "a stone;" devoutly praying that *I* may be benefited by these reflections, and not I myself alone, but *my patients*; and dare I? *I do*, include others, my cotemporaries. If, then, we have sinned together, together let us *repent*.

Two years ago a lady came into my hands, who had her left superior second bicuspid (anterior approximate surface) filled. A man of no mean ambition or modetate qualification performed the operation; but it was "*a man's failure in the execution of a trust.*" The failure was just here: the cervical wall (that is, the neck wall,) had not been *thoroughly* excavated, neither had the gold been thoroughly impacted, or the *junction of tooth and gold* been *evenly* finished.

The approximate walls and grinding surface had been most beautifully impacted and finished with gold; but, horrors! what an utter defeat at the cervical wall. Of what earthly benefit is it to make the outward parts appear beautiful, "if all within are full of dead *men's* bones, and all uncleanness"? If he had only packed some good amalgam, and had *thoroughly* prepared the *periphery* of his cavity, and finished by drawing floss silk over the cervical and approximate walls, leaving *no shelf*, how much better his success. One enters into no small obligation when he attempts to save life, (I mean attempts to cure disease), and not a whit less to save natural teeth.

Some of my friends may say that "they find this condition of things every day." Thank God, I do not; but I find it too often. Again, I have found another case in a left superior second molar this day. This is a compound cavity, and anterior approximate; the grinding and approximate surfaces are beautiful, but *death* is there if not stopped at the cervical wall. In the first case the pulp was *gone*. In this, the pulp is present, but would not have been so long, if the lesion had not been discovered; the tooth looked blue, showing leakage. Upon careful investigation I could find no trouble, except at the cervical wall: I could freely enter a large excavator, showing too clearly from whence came this blue color.

Now, at the risk of being called captious, I am going to put on record, that this kind of practice is too common altogether. These two cases are not the only ones I have met, by any means; but certainly they are two too many.

Such blunders are the fruit of trying to do more than the operator can do well, or are the result of ignorance.

My conception of the manner of filling an approximate cavity in the bicuspids or molars, is, first, a most thorough preparation of the cavity,

especially of its periphery. To leave no thin, weakened enamel, or partly disintegrated dentine, to break down or continue to decay. Most thorough preparation of the cervical wall, to the intent that all *peripheral disintegration* at this very weak point may be most effectually removed, leaving nothing but good healthy tissue to contend with the "elements." I do not care if some of the dentine is partly broken down inside the cavity, in, around, above or near the pulp; that may be well enough; but what I must have, if I wish to meet with any success, is *absolutely sound cervical aud approximate peripheral walls.* If a compound cavity, I will add *sound distal* walls. In anything short of this I am guilty of a breach of trust. I will observe that I endeavor to cut a very fine groove at my cervical wall, not round, as the form of the cavity usually is, but square across from (in the superior arch) the palatine to the buccal side, making a right angle with my approximate walls. This line is at, or a little farther in, than at the junction of the enamel and dentine at this place. By this right-angle form of the cervical portion of my cavity, when I start and continue my operation away from said wall, I *know* that I have a "firm foundation." I do not now, but once did, drill retaining pits.

At the time my gold has reached the edge of my cervical wall, my first thought is to finish it (the gold) as perfectly as possible around *that edge;* being careful to leave no *shelf* for the accumulation of foreign substances. I finish my walls with a burnisher driven by a hand mallet, just as fast as I pack my gold, and not leave my gold to be finished by *guess* as the last operation. Above all, in my opinion, great care should be taken in the finishing of the deepest portion of the cavity, and I hold it to be almost impossible to do so thoroughly, unless some attention is paid to it as one proceeds.

When my gold is all impacted and finished (proximately), with burnisher, as *I proceed in the whole operation* of filling, I have but little more labor to expend upon the final finishing of my work, and what is more satisfactory than anything else, is, that I *know* and do not *hope,* or *guess,* that my cervical wall is as it should be, to wit: flush with the cementum and enamel, and in as absolute juxtaposition to those tissues as possible, and *smoothly finished.* It takes time to do *perfect* operations, as it takes time and experience to learn how to do them. A safe rule for one's guidance is, to let each operation excel all that have preceded it.

THE Almaden mines of Spain are now only producing from 3,500 to 4,000 flasks of quicksilver per annum.

MENTAL PICTURING IN SCIENCE.

We do not doubt that the readers of dental literature are deeply interested in the discussion going on among scientific men, concerning the province of science and the proper methods of scientific research. The able editor of the *Popular Science Monthly* says in the March issue:

We pointed out some indications last month of the mitigated asperities in the Tyndall controversy, as evinced by the tone of the graver periodicals, and may now observe that a much more conciliatory and reasonable spirit begins to be manifested by the newspaper press. The topic is by no means worn out, and if our theological friends have the interests of education at heart, and are at all capable of gratitude, they will vote a medal of honor to Prof. Tyndall for his eminent services in arousing multitudes to think carefully upon important questions of which they have hitherto thought carelessly or not at all. There has not, in a long time, been such a general scientific and philosophic shaking-up as the Belfast Address has produced ; and the result must be, that many will work their way to much clearer conceptions of the scope of science and its relations to religion.

A leading article appeared in the last issue of *Church and State*, in the most excellent temper, but still ingeniously protesting against some of Prof. Tyndall's views. In his late reply to his critics, the Professor has said : "The kingdom of science, then, cometh not by observation and experiment alone, but is completed by fixing the roots of observation and experiment in a region inaccessible to both, and in dealing with which we are forced to fall back upon the picturing power of the mind." To this the writer takes exception, and questions whether it is right or advisable for the scientist "to fall back on the picturing power of the mind." He thinks it is allowable for the theologian to do this, but to scientists he says : "Why not go on observing, and leave others to conjecturing?" And, again, he remarks : "Of one thing we are sure, that, so far as the scientific investigators fall back upon the picturing power of the mind, they must relinquish the claims of *positive* science."

This strikes us as a quite erroneous view of the case. The scientific investigator can no more renounce the picturing faculty in his mind, than he can renounce the heart in his body : and he can no more confine himself to observing, and leave conjecturing to others, than he can confine himself to digestion, and leave respiration to others. To suppress the picturing power of the mind would put an embargo on all intellectual operations, and, in fact, put an end to thought itself. For what is thought but representation in consciousness, and what is it to

represent but to reproduce mentally, to picture, to image, or exercise the image-forming faculty—the imagination? There are, of course, other mental operations, but they are performed upon the representations in consciousness—upon the objects of thought imagined, or imaged to the mind's eye. Not a step can be taken in science except by this mental procedure. The object of science is truth, and what is truth but the faithful representation in thought, of the order and relations of natural things? Everybody imagines, but their mental images do not always correspond to the realities; their mental pictures *mis*represent. The man of science imagines—frames a view as the initial step of all his procedures; and then by the mental processes of comparison, reasoning, inference, proof—guided by observation and experiment—he strives to give truth to his view; that is, to harmonize it with facts, and all its parts with each other. Our writer says that science starts with observation and experiment, but the real starting-point is farther back. A mental representation must be made before it can be verified. A certain state of things is conceived or put together in thought, and is called an hypothesis; and then observation and experiment are appealed to, to test the correctness of the representation—the truthfulness of the mental picture. Science is not merely seeing with the eye or fumbling with instruments—any blockhead can do these—but it is to reconstruct Nature in thought, representing all her diverse objects, subtile relations, and complexities of change, so truly, that by every test the representation shall answer to the verities. To do this, the imagination, or image-forming faculty, comes into incessant play. And more than this, the genius of the discoverer depends, first of all, upon the vividness of his imagination and the power of keeping his pictures steadily before the mind's eye until their errors are detected or their accuracy established. The work of science, in fact, consists, from first to last, in the *verification of mental pictures.* The scientific man must be fertile in imaginative resources, but stern in his rejection of views that cannot be adjusted to facts. The poet has no such discipline; for his object is not truth. The theologian has no such discipline, for he cannot submit his views to observation and experiment, so as to test their congruity with the objective world and with each other. The picturing faculty is employed by all minds, but only the trained scientist makes it subservient to the true understanding of the order of things around.

Sufficient has been said to show that imagination is indispensable to science; but it may be asked, "If observation and experiment are the means of science for controlling the imagination, and if they furnish the conditions of its valid exercise, why prolong the vision beyond the

line of experimental evidence?" The reply is, that senses and instruments are imperfect, and their indications require to be supplemented by reason. They break down at a certain point, but that point is very far from being the limit of Nature. As experiments are perfected, the line of sensible demonstration is pushed backward constantly, disclosing a continuous order. It is a right of reason and a legitimate procedure of science to pursue this order, if the explication of known phenomena require it. The results, of course, must conform to what is established —must harmonize with all that observation and experiment have gained; but thought may be compelled to go far deeper than experiment for the explanation of facts already known.

To make this statement more concrete, let us take the very case put by Prof. Tyndall—the ultimate constitution of matter. By various lines of proof, the physicist is brought to the conclusion that there are such things as amazingly-minute physical units which he calls molecules. In their smallness they are far beyond the border of all sensible observation; but he is driven to the conclusion that they exist as realities, and he has to represent them in thought. He mentally pictures a molecule as the smallest particle of matter that can exist separately and retain its physical properties. Prof. Thompson finds physical and mathematical evidence pointing down to the actual size of molecules. From this he infers that those of water have diameters that fall within the limits of $\frac{1}{250000000}$ and $\frac{1}{500000000}$ of an inch; and adds that, if we conceive a sphere of water as large as a pea to be magnified to the size of the earth, each molecule being magnified to the same extent, the magnified structure would be coarser-grained than a heap of small lead shot, but less coarse-grained than a heap of cricket-balls. The evidence in this case may be insufficient; it may become more complete; but the conception of physical units, in subsensible depths far beyond the reach of possible observation or experiment, is inevitable to the physicist and perfectly legitimate to science.

The chemist now steps in with a new view of the case. He accepts the molecule of the physicist, but to him it is no longer a unit. He decomposes it into new kinds of matter, with new properties. He resolves it into a still lower order of units, which he terms atoms. Chemistry presents us with a vast mass of observations and experiments, but they cannot be connected, resolved, interpreted, and stated, except in transsensible terms of the imagination—molecules and atoms. Physics and chemistry, in their latest and highest aspects, are compelled to fall back upon these conceptions of subsensible units as nothing less than the ultimate foundations of science.

NOTES.

New York College of Dentistry.

EDITOR JOHNSTONS' DENTAL MISCELLANY.

SIR: The ninth Annual Commencement of the New York College of Dentistry was held at Association Hall, on the evening of March the 1st, 1875. The degree of D.D.S. was conferred by Dr. S. A. Main upon the following named gentlemen:

Manuel G. Angarica........... of Cuba
Chas. L. Dubar..............of France
Frank H. White...........of New York
Louis S. Marsh...........of New Jersey
Frank J. Moyer...........of New York
T. Chas. Tierney.........of New York
Wm. J. Branique..........of New York
Wm. T. La Roche........of New York
Daniel E. Morse..........of New York
George Viall..................of Ohio
Wm. J. Hewes................of Texas
George L. Lamson........of New York
J. Herbert Clark, M.D....of Ontario, Ca.
Henry J. Cressinger............of Ohio
Robert A. Fones.........of Connecticut
Henry S. Gould........of Massachusetts

The Faculty Prize was awarded to Robert A. Fones, of Connecticut.

The Address to the Graduates was delivered by Prof. Alex. W. Stein, M.D. Valedictory by Charles L. Dubar, D.D.S.

In all cases satisfactory written answers to questions (a written examination) is required instead of a thesis. The number of matriculators for 1874-75 is seventy.

FRANK ABBOTT, M.D., *Dean.*

Baltimore College of Dental Surgery.

The thirty-fifth Annual Commencement of the Baltimore College of Dental Surgery was held on Thursday, February 25th, 1875, at 7½ o'clock P. M., in Concordia Opera House. The Graduates for 1875 were:

Reverdy Brook Beall.......of Maryland
Charles Campbell..........of Maryland
John Ernest McB. Chevers, of W. Indies
Joel Beverly Coyle............Georgia.
Erastus Clarence Eversole......Virginia
Charles Denny Hilliard Fort..Mississippi
James Orlando Hodgkin........Virginia
Hardy Miles Hunter..............Texas
James Murphy King.........Tennessee
Charles Luther Moore..........Georgia
Charles James Phillips........California
Samuel Dillard Rambo.........Georgia
George Bangheart Raub.....New Jersey
Robert Edward Sparks..........Canada
I. Hamilton Thomas...........Virginia
Edward Franklin Wayman.......Texas
Garner Brown White....South Carolina

Essays upon the following subjects were given by the Graduates:

Mechanical Dentistry, Reverdy Brook Beall.

Decay of the Teeth, Charles Campbell.

Mechanical Dentistry, John Ernest McBean Chevers.

Diseases of the Teeth, Joel Beverly Coyle.

Artificial Teeth, Erastus Clarence Eversole.

Dentition, Charles Denny Hilliard Fort.

Dental Hygiene, James Orlando Hodgkin.

Dentarius, Hardy Miles Hunter.

The Teeth, James Murphy King.

Dental Prosthesis, Charles Luther Moore.

Artificial Dentures, Charles James Phillips.

Anæsthetics, Samuel Dillard Rambo.

Dental Caries, George Bangheart Raub.

Nitrous Oxide Gas as an Anæsthetic

for Dental Operations, Robert Edward Sparks.

Filling Teeth, I. Hamilton Thomas.

The Circulation, Edward Franklin Wayman.

Dental Caries, Garner Brown White.

The Announcement of Graduates and Conferring of Degrees was made by Ferdinand J. S. Gorgas, A.M., M.D., D.D.S., Professor of Dental Surgery and Therapeutics,

The Valedictory Address was made by Thomas S. Latimer, M.D., Professor of Anatomy.

An address was made by James Murphy King, of the Graduating Class.

The thirty-sixth Annual Session will commence on the 14th of October, 1875, and continue until March, 1876.

Corrections.

Dr. H. L. Sage requests us to make the following corrections in his article published in our last issue. He fears that the misprints may be credited to him instead of to the printer:

On page 72, seventh line from the top, leave out "apparently." It is superfluous, and was not in the MSS.

On page 72, ninth line from the top, for "vertes" read vertex.

On page 73, second line from the top, read for "and for that matter" and *they too* for that matter, in parenthesis.

Annecdote.

In one of the courts of Hampden County (this State), a dentist sued a patient to recover the price of a set of teeth, payment being resisted on the ground of no fit, and consequent uselessness, while the dentist alleged that disease had attacked the jaw, causing absorption, for which he was in no wise responsible, and thereby spoiling the fit. While the case was being argued, one of the lawyers wrote the following, and passed it about among the members of the bar, causing some amusement:

Disease or dentistry, we're left in doubt;
The jaw diminished and the teeth fell out.
The lawyers took it when the doctors ceased,
The parties fell out, and the jaw increased.

Respectfully,
N. M., D.D.S.

Reagent for Strychnia.

One part of permanganate of potassa dissolved in two hundred parts of sulphuric acid enables us to detect 1-900,000 of strychnia, while powdered bichromate of potassa fails to produce any effect when the fluid in which this alkaloid is dissolved contains less than 1-100,000th of it.—*Wenzell, Repert. de Pharm.*

Preservation of Milk and Beer.

The addition of borax or of boracic acid to milk or beer tends to preserve them. Numerous experiments have shown that boric acid retards the free acid reaction of milk and the separation of the cream so thoroughly, that after standing 120 hours at 10° R, there was only a thin layer of cream.—*Hirschberg, Archiv. der Pharm.*

Collodion.

If a plate of glass be covered with a coating of collodion—after it has dried—a sheet of printed paper placed upon it and rubbed over with the hand will impress the letters upon the collodion, which will remain visible after the collodion has become perfectly dried. The impression is best seen by transparency and with reflected light; if the impressed surface be breathed upon, the letters will appear bright upon an opaque ground.

[*Pharm. Zeitung.*

JOHNSTONS'

Dental Miscellany.

Vol. II.——*APRIL, 1875.*——No. 16.

PROSTHETIC TREATMENT OF A CASE OF HEREDITARY SYPHILIS.

By Norman W. Kingsley.

Some three years since a Miss fourteen years of age was brought to me by her mother, who said that the child had been for two or three years under the treatment of one of the most distinguished physicians and surgeons of America for a catarrhal difficulty—that she had lost nearly all her upper teeth, and was by her physician recommended to me. There was no remarkable change in the expression or appearance of the face, other than that associated with the loss of upper teeth. The upper lip was a little sunken, but no other feature seemed to be changed. An examination of the oral cavity showed three teeth only remaining in the upper jaw, viz.: the first and second molars of the right side, and the second molar of the left side, while all the roof of the mouth, between and anterior to these teeth, was gone. The situation at that time is well illustrated in Fig. 1. A A represents the inner or oral surface of the lip as it was pulled out and forward in taking an impression. The semi-circle B B marks the dividing line between the oral and nasal cavities. This semi-circular rim was soft, flexible and elastic, devoid of bone or cartilage in any part except at its junction with the alveolar process which surrounded the roots of the remaining teeth. The soft palate marked C had not lost its integrity; the uvula and the superior pharynx were also undisturbed. Neither were the bones of the nasal cavity destroyed. D D represents the vomer and turbinated bones, covered with thickened and puffy tissue,

completely filling the nasal cavity, and hanging quite level with the original roof of the mouth, as indicated by the anterior edge of the soft palate C, and the rim B B.

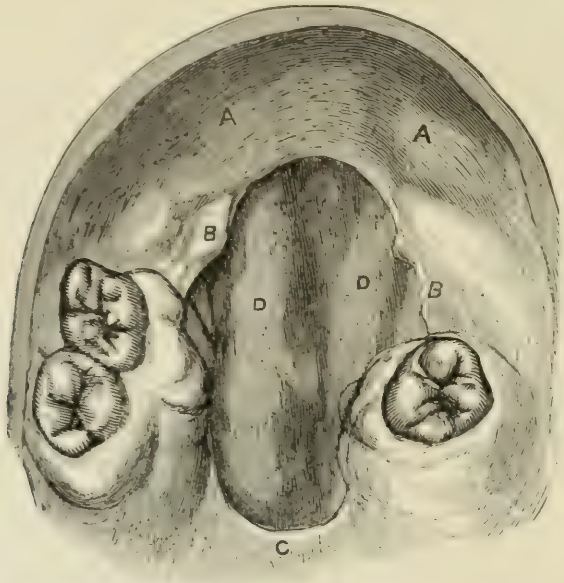


FIG. 1.

So completely did these enlargements fill the cavity, and shut off escape by the nostrils, that the voice was not interfered with in distinctness of enunciation, more than commonly arises from a cold in the head. Not being altogether pleased with the general appearance of the tissues, I consulted with her physician, who was confident that the disease was entirely eradicated, that there was no doubt of its nature and hereditary character, and furthermore "that it was not likely that the mother was aware of either its true nature or its origin, as he had never conversed with her on the subject."

I made an upper set of teeth for the patient, using vulcanite as a base, and making it as light as possible.

There was nothing peculiar in this proceeding, from taking an impression, and going on in the usual way for making a set of teeth in ordinary cases. They were supported by clasping around the molars, and lay in close contact to the tissues filling the nasal cavity. The only gain to the patient was in the restoration of expression to the upper lip, and a little improved masticatory power. The articulation of the voice remained the same. * * * * *

I saw no more of my patient for two years, when the mother again brought her, desiring, as she said, that I should "put a little prop on the teeth, to go into her daughters' nose and keep it up."

The two years which had intervened had made sad havoc with her features. The bridge of the nose was sunken, and the end had flattened and receded until it was nearly on a line with the chin and forehead. This retrocession of the base of the nose had carried back the upper part of the lip, drawing it in and over the artificial teeth and plate, so as to produce a most unfortunate expression. With the teeth out of the mouth, the deformity of external features was even worse, and is most accurately shown in Fig. 2.

Fig. 2.

There being no support for the lip, it falls back in a straight line from one corner of the mouth to the other.

An examination of the oral cavity showed how continuous and destructive had been the disease.

Another tooth had fallen out, and the process had wasted away—the vomer and turbinated bones were entirely gone. The soft palate was apparently undisturbed, nor was there any marked change in buccal cavity proper; but above the opening through the roof, there was an immense cavern, much larger than the opening, in every direction.

This condition is as well represented in Fig. 3 as it is possible by wood engraving, but it gives no conception of the height of this cavity, nor of its breadth in any direction. The former soft and flexible condition of the rim, marked B B, had now changed to a cartilage, firm to the touch, and unyielding as a cable, and the remaining teeth were loose in their sockets, but the tissues looked as if the disease had spent its force.

The voice, too, had undergone its changes. From the clearing out of the nasal cavity had come an improvement in tone, when the artificial teeth were in place, but when they were out of the mouth, the voice blowing through the great cavity and the nostrils, rendered speech

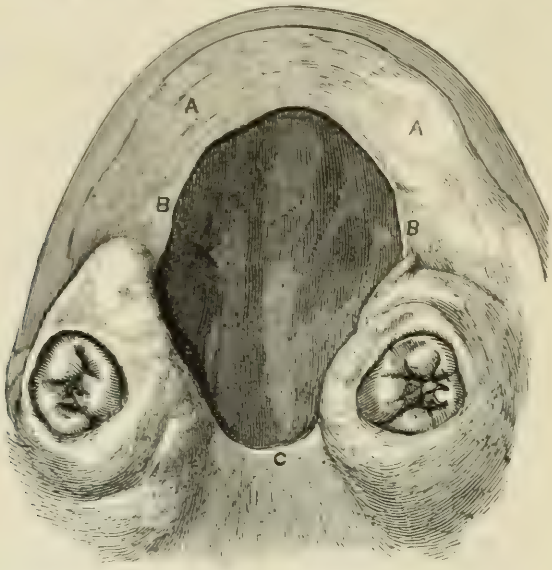


FIG. 3.

almost impossible. Prosthetic treatment now required mainly a restoration of the external features, and the most serious difficulty to overcome was the aforementioned contracted band of cartilage. Any appliance which did not force out and sustain in an advanced position, the upper part of the lip, and the base of the nose, would be a failure, and the only safe way, considering the liability to excite destructive inflammation, was to compel the cartilage to relax under gentle but constant and aggressive pressure. Pressure upon one part involved a base to antagonize against, which would bear *without yielding*, and *without danger*, an equal amount of pressure. As there were no solid opposing tissues to abut against, the problem became a very difficult one, and was only solved by the determination to spread the appliance over just as large a surface as possible ; fit it acurately to every inequality, and thus, while the pressure in front was concentrated upon the median line, it would be antagonized by distribution over a very large surface.

A second serious difficulty to overcome was the conception of an appliance which could pass the comparatively small opening in the roof of the mouth, and then by inherent power expand, enter the cavity of the nasal cartilage, and constantly press forward and upward.

Measured from front to rear, the nasal cavity which must be operated upon by the instrument was nearly twice as long as the entrance to it.

Fig. 4 shows the completed instrument.

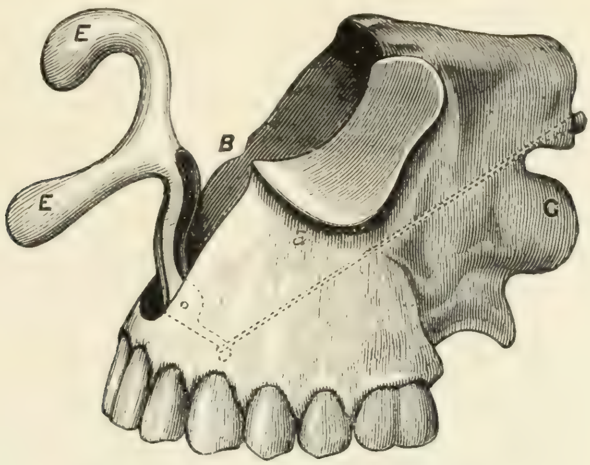


Fig. 4.

It is a very thin shell of black vulcanite. The appearance from below is that of an ordinary set of teeth. It is intended to restore the normal contour to the roof of the mouth ; passes around the molar teeth, as seen in fig. 2, crosses over and laps sufficiently on to the soft palate to shut the opening. In Fig. 4 the letter C shows the upper surface of the apron which lies on the anterior edge of the soft palate, B B shows the groove formed for the reception of the rim of cartilage marked with the same letters in Fig. 2.

The instrument reaches up to the top of the nasal cavity, but is open front and rear for respiration, which passes unobstructed through the nose, through the shell, and behind the soft palate, without entrance to or from the mouth.

The processes E E pass into the nose and support the sunken portions. It must be observed that in the position in which the instrument is here shown it could by no possibility pass the opening, as the anterior border of the opening is represented by a line running from B to B.

The nasal elevator must therefore be so arranged as to fall back of the line B B to be introduced, and then must expand into its position. This was accomplished by attaching the elevator to the denture by a joint, as seen in the engraving, and also by extending an arm of the elevator within the shell, and terminating it with a hook. As the imagination must be drawn upon, the dotted line in the engraving shows

the form of that part concealed from view. The means by which I should keep up a constant pressure, which should both relax the cartilage rim and restore the nose, and without too complex mechanism, was another serious problem until I caught a small ring of rubber tubing over the hook within the shell, and drew it back to the edge of the shell, and there caught it over a spur of vulcanite made to receive it. This invisible rubber strap is also indicated by a dotted line. The nasal elevator, as shown in the engraving, must be forced back until it falls completely within the shell, before the instrument can be carried to its place. The patient manages this without any difficulty, by putting the thumb in the roof of the denture, and holding the elevator back out of the way with the forefinger, and, when carried up, the processes E E readily find their places.

Fig. 5.

The result, after a year's trial, is shown in Fig. 5. There was naturally no immediate change. There was very little irritation from the beginning, and no destructive inflammation. The bearings E E caused a little soreness, and they were wound with lint and covered with simple-cerate. The lower process now comes to the very tip of the nose between the nostrils, and can be seen or touched in either nostril, but this part being made pink in color, is not noticeable to the ordinary observer.

It is with no little satisfaction that I have viewed the action of the elastic rubber as the power to elevate the nose—a power so completely under the control of the patient, regulated at will, increased or dimin-

ished, involving little care and no expense, that it leaves nothing to be desired.

The steps by which this nasal shell and denture were produced were not remarkable, save in two particulars.

Firstly, to obtain an accurate impression in all its details of so large a nasal cavity, and remove it through so contracted an opening, is out of ordinary experience. The course pursued was described in the MISCELLANY, volume 1, page 208, to which the interested reader is referred. Secondly, the shell and denture were completed in wax and gutta-percha, as thin and delicate as finally required, before it was placed in the flask, and necessarily a core of plaster filled all the interior, which was readily removed after vulcanization.

THE PATHOLOGY OF TOBACCO.

A paper read before the "American Academy of Dental Science" at its last annual meeting held in Boston, Sept. 28th, 1874, by Dr. W. B. MEAD, of Providence, R. I.

MR. PRESIDENT AND GENTLEMEN :

I do not propose in the short time allotted me on this occasion to enter into any learned disquisition upon subjects that ordinarily engage your attention—I come not to discuss the merits of the old or new systems of practice—of trip-hammers or trowels—enginery or muscle—plain or contour filling—prolonged or rapid operations. With all of these you are familiar, and the solution, if not contained in a nut-shell, may possibly be found, as was facetiously intimated on a recent occasion, in that *other shell* peculiar to some of our shores.

I could not find it within me, on receiving the flattering invitation of the committee to address the Academy at its annual meeting, to follow the advice of a certain editor to a troublesome contributor when besieging his sanctum for something to write about—*to right about face*—though the sequel may prove that I have missed one of the grandest opportunities of a lifetime for holding my tongue. Be that as it may, I have followed the first impulse that arose, and which has been intensified by my association with you, (and I *must* say you are not the *worst* set of fellows in the world,) and will ask your attention to a subject that concerns not only the oral cavity, which receives the first fruits of the Siren, but the whole economy which it attacks by the most insidious and seductive approaches—*Nicotiana Tabacum.*

And here permit me to remark that I have worshiped long years

at this shrine myself, and whatever I may have to present on this subject will be largely tinctured, like the tale of the *old Trojan* in rehearsing his labors and his sorrows, with the miseries which I myself have seen, and in which I have borne so large a part.

> "; quaeque ipse miserrima vidi,
> Et quorum pars magna fui."

A few words upon the origin of the plant. Tobacco is an annual indigenous in tropical America, and cultivated in most civilized countries. It was first carried to Spain soon after the discovery of America, afterwards to France by John Nicot, a Portuguese, from whom it took its generic name, and still later, by Sir Francis Drake, to England, from Virginia. And now, after a lapse of four centuries, it circles the wide creation round, its pestilential streams and noxious incense belching forth from the volcanic throats of half the human race.

Tobacco contains two active principles—*Nicotia* and *Nicotianin*, or *Nicotin.* The former is an organic volatile alkali, and the latter a concrete volatile oil, which constitutes the odorous principle of the drug.

While *Nicotia,* which constitutes all that is really valuable medicinally in the plant, is almost inodorous, with a power that chemical science alone can reveal, and which challenges notoriety only with "that decent boldness" which is said

> "Ever meets with friends,
> Succeeds, and ev'n a stranger recommends;"

Nicotin salutes the nostrils with every puff of your Havana or Meerschaum.

It asserts its presence in the halls of affluence and in the dens of poverty; in the busy marts of industry as well as in remote desert wilds; in the steamship and in the rail-car; at marriage feasts and in the presence of death; is almost as universal as sunlight, and all-pervading as the earth-surrounding air. It is a braggart and an upstart, a mountebank and a pretender—the very *Monsieur Mallan* of the plant—

It is observable in this, as in many other instances, that real worth makes no parade of its virtues. "It vaunteth not itself, neither is it *puffed* up."

In addition to these two principles, Tobacco yields an empyreumatic oil which is very acrid and very poisonous. This oil, together with acetic acid, is disengaged with the smoke by a species of destructive distillation going on continually while smoking, and keeps the gums and mucous membrane of the mouth in a state of perpetual irritation; thereby not only endangering the healthy condition of these tissues,

but involving, sooner or later, the dental organs with which they are so intimately and closely connected.

There is, in addition to this direct action upon the mouth—an absorption more or less of the active principle, producing a disturbing influence upon those nervous centres by or through which its functions are regulated. In short, when the wires are down, or the transmitting agencies are in any way impaired, not only are imperfect regional messages conveyed, but the whole net-work of communication with its numerous ganglionic and plexal stations is involved in the common ruin.

Tobacco is locally an excitant. When applied to the mucous membrane, as has been remarked, it is an irritant. In the nostrils it produces sneezing and an increase of the nasal secretions; in the mouth a bitter, acrid, nauseating taste, and a copious flow of saliva; in the throat, a peculiar sensation of acrimony and heat; in the stomach, a feeling of uneasiness and depression, followed by nausea and vomiting; and in the rectum, relaxation and purging.

Its general action is that of a *powerful sedative to the nervous system*, and through that to the circulation. Its effects upon the system are of the same character, to whatever surface it be applied.

Therapeutically considered, its principal use, and one which its sedative and nauseating tendency peculiarly favors, is for producing muscular relaxation, as in strangulated hernia, obstinate colic, and severe regional spasms, such as croup, asthma, tetanus, etc.

It possesses also slight anæsthetic power, which adds to its efficacy in this respect. No doubt many a raging molar that has been made to triturate untold quantities of *pigtail* and pure Virginia leaf—whose surfaces have been abraded and worn until the citadel of life has been invaded—has found its quietus, at last, in the very bane to which it has been subjected. Thus does Nature often fulfill her plan of educing good from evil, and vindicate her ways to man.

When employed so as not to occasion any epigastric uneasiness or cerebral disturbance, it produces an agreeable tranquillizing effect, with feelings of delicious languor and repose, which, like the *melody* of certain *sea nymphs*, allure the unwary to destruction. With this general nervous quietude, there is a peculiar impression produced upon the brain, which they only who have felt it can appreciate. There is no general tendency to drowsiness through all this state of dreamy delight, but rather a disposition to wakefulness; and many resort to the use of the drug as a source of inspiration as well as a means of concentration in prolonged intellectual and mental labors.

Physiologists are disposed to look upon this effect as the result of a slight sedative operation, which, quieting any little nervous uneasiness or mental distractions to which most persons are sometimes liable, enables them to grapple with the subject before them more clearly and with greater ease.

It is different in this respect from alcohol and opium, which produce a temporary exhilaration and vigor; and when augmented in degree diverges still more widely from the effects produced by these cerebral stimulants, and indeed is in direct opposition to them. The conclusion to be drawn from these facts is, that opium and alcohol are the best agents for counteracting the effects of the excessive use of tobacco, which would not be the case were the latter a stimulant of the brain.

I well remember the reply a fellow student once made me; it was apt and to the point, for he had a keen perception of the rationale of the opposite effects of rum and tobacco upon himself. He was addicted to both, and a willing slave to either; but more particularly to tobacco. I remarked to him that his inordinate chewing must create an appetite for *rum*. "Yes," he replied, "and *rum* creates an appetite for *tobacco*." It is questionable if the two combined would sustain life long. I should very much prefer to adopt the theory of an old yeoman whom I once heard remark that he could live forever on codfish and new rum; for, said he, *codfish* makes me *dry* and *new rum* makes me *hungry*. So that if people will persist in taking their *rum*, let me suggest that they substitute codfish for tobacco.

I can recall from my own experience how, when completely saturated with and steeped in *Nicotin*, I never knew what a substantial physiological hunger was; food to me seemed more for the purpose of creating a stimulus to be subdued by an immediate indulgence in "fine-cut" or choice "wigwam," than for repairing the natural wastes or sustaining the even flow of the life currents. The morbid appetite became so strong that to resist was torture, and to yield, impending destruction. Either I must subdue the monster or it would subdue me; must quit the lap of the enchantress, or be forever imprisoned in her arms.

You who have abandoned a pet vice, or broken away from some darling sin, can appreciate the situation. All this may be deemed a weakness or the inconsequential teachings of fable; but I speak of those things I myself have seen so full of greatest misery, and in which I have borne so large a part; and I can well understand the figurative dangers of that old navigator who caused himself to be chained to the mast and

placed impenetrable wax in the ears of his crew, that they might all pass in safety that fabled throng whose songs no human ear could withstand, and whose influence no mortal ever felt and lived.

In an emergency like that to which I have referred, we have but to imitate the wisdom, firmness and prudence of this fabled hero, and once beyond the enchanter's reach the danger is over and the enchanter dies.

In this connection, and while reference has been made to travels by sea, (although those of you who have experienced the sensation may not have been particularly *enchanted* by it) I will remark that there is a great similarity between the influences that produce sea-sickness and the operation of tobacco upon the new beginner. Many of you can recall your first cigar—I can. I was a mere boy, and the passion came over me to attempt the manly part; a few vigorous puffs sufficed. My eyes were opened, but no fig-leaf could shut out from my poor naked sensibilities, the unutterable misery of the few succeeding hours. I longed to be an angel then, in the fullness of my grief; anything to blot out about the only portion of my existence that I would not now recall. Connect these sensations now, with the first tribute you ever paid to old Neptune, and the analogy is complete.

Tobacco rarely produces death when taken into the stomach; it being speedily rejected by that organ, through the nausea and vomiting that it at once excites. But when applied to other surfaces, where its action is allowed to remain undisturbed, it soon develops all of its poisonous qualities, producing, in addition to most distressing nausea and vomiting, giddiness, mental confusion and dimness of vision, great muscular relaxation and weakness, paleness and coldness of the surface, drowsiness, torpor and universal prostration. The remedial agents, after removing the cause to as great an extent as possible, and applying warmth in some shape externally, seem to lie, as has been remarked, in opiates and alcoholic stimulants; still first the raging sea, and then sustain its floods by suitable invigorating currents.

It has been claimed that if indulged in moderately it is not generally productive of any obvious injury to health. This, in my opinion, is a delusion and a snare. The waters that slowly but gradually undermine huge granite walls and ponderous embankments of super-incumbent earth, will, when a rift is made, no less surely rush madly and irresistibly to the ocean level, carrying death and devastation before them, than that this insidious, delusive, dear, delicious tempter will, by its enervating influence upon the great nervous centres where

the first general impression is made, derange and impair the functions of those organs to which they are distributed.

This is more peculiarly the case as regards the pneumogastric or par-vagum nerve, whose ramifications and connections with most of the vital organs are almost as extensive as the great sympathetic itself. Its intimate relations with this latter nerve are such that, whatever influences it receives from external impressions, are reflected throughout all the organic functions, which, for a wise purpose, were made involuntary. I speak now of the sympathetic system. The object of this system seems to be to bind all parts of the body together, and to combine and harmonize their actions. It takes care that no part of the system acts in such a way as to injure any other part; if one organ becomes diseased it restricts the functions of another, so that its action shall not aggravate the condition of its neighbor; it controls digestion, nutrition, secretion, absorption, circulation, etc. These are all natural processes, and must go on uninfluenced by the will—as well while the brain is asleep as in its wakeful hours. Human volition here is of no avail. Nature asserts supreme control and allows no intruders upon her sacred soil. She scents danger from afar, and advances her outposts to the extreme limits of safety. Her most trusty sentinel is the pneumogastric nerve; harm but a feather in his cap, fetter or impede his action, and the whole system is alarmed at the aggression.

I remember when a student with Doctor Twitchell, of New Hampshire—a man, Mr. President, whom you and many of us well remember—of hearing him deliver a dissertation on this subject of Tobacco before the State Medical Society. For force of reasoning, boldness of expression and clearness of demonstration, I have never heard that effort equaled. He was remarkable for great depth and perspicuity upon every subject he addressed himself to. In conversation with General Wilson the past summer, he told me that whenever he had a difficult case in court requiring a medical expert, he would consult with Dr. Twitchell, and he would make that part of the case as clear and familiar to him (all lawyer as he was) as though it were mapped out on a blackboard. His words were ever ringing in my ears whenever I rolled the sweet morsel under my tongue, or steeped my senses in the aroma of the fascinating weed. I would I could recall his words or impress you with the certainty of his conclusions. Great as he was in every department of medicine and surgery, he left no written record of his teachings behind him. He was a consistent and bitter foe to tobacco as a luxury in all its forms.

When called upon to prescribe for a patient, (unless convinced to the contrary,) almost the first question he would ask was, "Do you use tobacco in any form?" If the reply was in the affirmative he always demanded as a prerequisite that he should desist from its use entirely while under his treatment; for, said he, there is hardly any form of disease it will not aggravate, or any symptom, proximate or remote, it may not induce.

Persons of an active temperament, or of high nervous susceptibility, are sooner and more injuriously impressed by the use of tobacco than those of a sluggish, lymphatic temperament. Whatever the habit indulged in, it is pushed with the same vigor and personal dash that characterizes almost everything they undertake. Quick and impulsive in both thought and action, they plunge deeper and more carelessly into the sloughs of excess that devour them the more piteously from their inability to withstand them. The result is deeply injurious, greatly impairing the vigor of the nervous system and health generally, shortening life, if not directly, at least by rendering the system less liable to resist noxious agents.

We behold hydra-headed *Dyspepsia*, with ghastly look, and pale, attenuated form, like a ghost from the Inferno, striding in our paths or pushing us from our stools. In its train are the various nervous disorders which prey upon the heart and brain, making life an epitome of those dread regions that Dante dreamed of, and old Homer sung.

Dentists as a class, I believe, if not originally, yet from the very nature of their employment, taxing as it does the nervous system by the severity of the draughts made upon it, are to be classed among the *excitables*, and how often do we see, even in well-regulated offices, cuspadors to the right of us, and cuspadors to the left of us; with just a doubt as to which is the more neccessary, the one for the patient or the one for the operator.

Kind Heaven shower its mercies upon each individual; for if the keen excavator imparts torture to the sensitive bone of the one, a habit both disgusting and destructive is preying upon the sensitive organization of the other.

Excessive use of tobacco is said to produce a similar condition to that induced by the omission of alcoholic drinks in the case of the drunkard: which again illustrates the opposite effects of tobacco and alcohol; a condition being produced by the direct action of the one very similar to that resulting from the omission of the other.

Is the use of tobacco directly injurious to the teeth?—Aside from

actual mechanical abrasion on the part of those who indulge in inordinate chewing of the grosser forms of the weed. I am inclined to think not. It is true that foreign substances are sometimes incorporated with the leaf which add to the natural acridity of the plant, thus rendering it positively destructive to the limy salts of the teeth.

We have seen that tobacco is an irritant both acrid and poisonous. It attacks the softer tissues, causing inflammation and recession from the necks of the teeth, and by its remote action upon the general system it disturbs the secretions and deranges digestion, causing an influx of acrid saliva, from which source, more than all others, dates your occupation and mine. I do not say that the use of tobacco is the cause of all this, but that it forms one of the principal agents in effecting these pathological changes in the condition of the fluids of the system, no one will attempt to deny.

The Creator intended that all the members of the same body should be equally durable; but certain laws of nature, violated by us habitually, and that, too, after repeated admonitions by way of organic reminders, turn upon us at last, when unable longer to endure the outrages of rebellion, and smite us in our faces, breaking our *teeth*, and robbing us of the means of preserving health which we do not appear to prize.

AN ESSAY UPON EXOSTOSIS.

Read before the Springfield Dental Club, by C. T. STOCKWELL.

MR. PRESIDENT, AND GENTLEMEN OF THE SPRINGFIELD DENTAL CLUB:

The fact that the honor of preparing and reading before you, this evening, an essay upon Exostosis, has been proffered to and declined by two of your number, older and doubtless wiser than myself, induces me to say in the outstart, that I have consented to appear before you in this capacity with many misgivings and much hesitancy.

It is sometimes said that the *ignorant* are fearless, and the *learned* only are truly modest; conscious, however, of my own blindness in regard to this somewhat blind subject, I have accepted the honor, chiefly for personal reasons: flattering myself with the hope that I may secure a *personal* benefit by a review of the matter, and by searching out new light in regard to a subject generally conceded to be not well understood.

The books are quite reticent, as far as I am aware, upon this topic,

passing over the subject with a few general remarks upon its nature, reiterating doubts as to its cause, etc., and in a few short paragraphs dismissing the subject altogether. We are therefore thrown mainly upon our own resources, or left to gather up such facts of a general nature as we have at command. Consequently, I cannot come before you at this time bristling with sharp points or finely spun theories, but will simply call your attention to a few inquiries under the following heads :

First, its *nature ;* second, its *cause ;* third, its *diagnosis ;* and fourth, its *treatment.*

Exostosis is a term derived from a compound Greek word, or expressive roots ; ex, extra ; os, bone ; to, a conjunction ; sis, inflammation. Thus : extra bone, inflammation of ; or, rather, inflammation as a *condition* of the presence of the extra bone.

It denotes an *osseous tumor*, or enlarged growth, which forms on the surface of bones, and is analogous to true bone, and also has a history common to the hypertrophy of all tissue.

Exostosis differs from Enostosis ; in the first case it is an abnormal growth, or osseous tumor upon the *surface* of bones, while in the latter case—Enostosis—the tumor appears on the *inner* surface or cavities of bone.

No organ or structure is exempt from this disease. It may be *general,* or merely *local,* and is liable to appear at all periods of life.

In Dental Exostosis we often find the entire surface of the cementum enlarged, while perhaps more often we find the abnormal growth at the apex of the root, varying greatly in size and extent.

Garretson speaks of three varieties of this disease, to wit : "Ivory Extosis, that which is ivory-like ; Laminæ Exostosis, that which is made up of distinct layers or fibers ; and Spongy Exostosis, that which is like the spongy tissue of bone."

Other authors speak of it as being simply analogous to bone, or rather, in Dental Exostosis, to the cementum upon which it is found ; and as cementum is, essentially at least, entirely analogous to true bone, containing the lacunæ and canalliculi of true bone, I think it will answer our purpose this evening to claim only that the *nature* of Exostosis is that of the tissue upon which it is found.

And this leads us to the consideration of the second heading—its *cause,* or history. As before remarked, hypertrophy of all tissues has a common history, and the cause is traceable, unquestionably, *directly* to inflammation in some of its various forms.

From Garretson I again quote as follows: "That local irritation is the chief cause of Exostosis is satisfactorily proven, I think, by reference to parts most subject to this disease or interference. The teeth, for example, are found extosed in a thousand instances to one of any other bone; and certainly no bones are so constantly found in an irritative condition. I use the term bone, reminding the reader that the portion of the tooth which takes on this morbid action is almost in every proper sense, true bone." Referring, I suppose, to the fact of similarity between cementum and true bone.

Gross, in his treatise on General Surgery, speaking of hypertrophy in its general sense, says: "The causes of hypertrophy are first, inordinate exercise of an organ; secondly, mechanical obstruction; and thirdly, chronic inflammation."

Thus we see that Garretson says "local irritation," while Gross says "chronic inflammation," an apparent, although not real contradiction; for I understand Garretson to mean simply this—an inflammation, or chronic inflammation, if you please, *localized.*

An inflammation terminating in *resolution* can hardly be said to have become chronic, and *thus* terminating, certainly would not produce such a phenomenon as we have under consideration.

Authors generally agree, I believe, as to the supposed fact of Exostosis being the result of *augmentation* of *nutriment* to a part. As a result of a blow, the presence of some foreign body, or from the almost innumerable number of causes, an irritation of the periosteum is set up, and, as a consequence, an augmented infusion of plasma takes place, which, failing to become absorbed, the absorbent vessels being *overtaxed* or *debilitated* by the inflamed condition of the parts, or perhaps more likely, *obstructed mechanically*—the lymph, the organizable substance of the plasma, becomes in due time organized into analogous tissue. This is not, however, a direct deposit of calcific matter. The organized accumulation first takes on—so to speak—the appearance of the cellular tissue, and *subsequently* becomes calcified.

Thus far it seems clear and plain; but when we attempt to look deeper, and search out the cause of the *inflammation* or attendant *irritation*, we come into a wide field of uncertain inquiry.

In many cases it is unquestionably caused by the presence of a dead pulp; but that that is not the only cause, as we would infer from some writers, is proven by the fact that we frequently find the roots of teeth in an extosed condition, when the pulp is alive and in a perfectly normal state.

Neither is the use of artificial dentures, as has been suggested by some, in any sense a universal cause ; for we find this difficulty among the young, and common with those who have never worn artificial teeth.

Caries is supposed quite generally to be an almost universal cause ; but who can tell, when *both* are present in the same tooth, whether caries *and* Exostosis are not *both* a result of one common hidden cause ; for the *effect* of inflammation is both to *build up* and *pull down ;* to destroy, as well as to restore.

A morbid action of the general system is also charged with being a prevalent cause, and I confess that I pinned a good deal of faith to this theory at first ; but upon looking deeper into the history and nature of inflammation, I now question very much whether a morbid action will *produce* inflammation at all. I would rather say that a morbid action of the general system is a *favorable auxiliary*, and would only render the subject of it *more susceptible* to an *unfavorable termination* of inflammation.

For instance, take a person who is greatly debilitated, and the *probabilities* are that *suppuration* or *gangrene* will be the result or termination of inflammation, while if the reverse is true, and the patient is fully up to the standard of perfect health, the *probabilities* are that *resolution* would be the termination. For, in case of a blow which causes an irritation of the periosteum of a bone, and there follows a consequent infusion of plasma, the system being active and in a perfectly normal condition, the *absorbent* vessels are consequently active and healthy, and, as nature intended, are able to successfully meet and combat with the exigencies of the situation, and carry off through the system the surplus of lymph deposited by the excited periosteum. Therefore I am strongly inclined to believe that it is the *medium* class, as regards vigor of health, that are most subject to the disease we have under discussion.

Inordinate exercise, as suggested by Gross, would seem to have some foundation, from the fact that this disease most frequently is found to be present upon the molars and bicuspids.

In fact, at this writing, I do not recall even a single instance where the incisors were thus effected, and it is also extremely rare that the cuspids or eye teeth are found to be in an extosed condition. These facts, I say, would seem at first thought to give some color to this theory, inasmuch as the organs most commonly affected are those most severely used in the process of mastication ; but, per contra, it

may be argued that the development produced by exercise, as in the muscles of the blacksmith's arm, is *not* that of a diseased condition. If it were, hypertrophy of the teeth might be considered a desirable condition, giving them strength and powers of endurance, as in the case of the smith's arm. I am ready to admit, however, that Exostosis of the teeth *may* have its origin in the *in*ordinate use or exercise of these organs.

For instance, the cracking of nuts, etc., with the teeth, may have the effect of a *concussion*, and produce thereby an irritation which will result in Exostosis. Doubtless such is often the case, and patients should be warned of the danger of such a pernicious practice. Thus, it is evident that it is easier to answer the above inquiry as to the cause, by the negative. It is easier to say what the cause may *not* be, than to determine what it *is*.

There are, however, many apparent causes of inflammation—in fact they may be said to be almost innumerable; and it is reasonable to suppose, I think, that *all* or *any* of the various causes of inflammation *may* be chargeable with this phenomenon as a consequent result. Yea more, it is reasonable to *maintain* even that such is the fact.

Excessive heat or cold we know to be a prolific cause of inflammation. Again, inflammation of a part is frequently known to induce an inflammation in corresponding parts that are intimately related to each other by similarity of structure or function.

This theory I consider to be eminently pertinent to the case in discussion. While I would not, of course, be understood to claim that *all* cases of Exostosis, or even a majority of cases, are thus induced, yet it seems to me to be a reasonable conclusion that this is, at least, a *prolific* cause.

For instance, a person of medium constitutional vigor is subjected to weeks, and perhaps months of suffering from toothache. The suffering may arise from one or more of these organs. He fails, for various reasons, to obtain relief. Perhaps he is too poor, or, more likely, too negligent to avail himself of the proper means of relief, and simply allows them to *ache* on, and *decay* on; the offending member is thus allowed to be in an almost continued state of irritation, which communicates itself, by the laws of sympathy, through the intimately connected line of nerve tissue, to analogous parts, and, as likely as otherwise, to remote organs. Thus an irritation is instigated, the secretive functions are excited, nutriment is augmented, lymph is accumulated, and in due time—about eleven days—commences to

organize, and thus the result, Exostosis, is inaugurated. Should the cause of all this mischief, to wit, the aching teeth, be suddenly removed, or rather, removed before the difficulty has become of too long standing, and the patient be in a comparatively healthy condition, and consequently the absorbent system be active and vigorous, nature will be able, doubtless, to remove, or tear down this abnormal accumulation, and restore the organ to its normal condition, as is often the case in other parts of the human structure. This view of the subject, I think, is strengthened by the fact that we so commonly find the teeth in an extosed condition where caries, or carious teeth, are general, and the patient has suffered much from this cause.

Reference is made by some authors to an "ossific" or constitutional "diathesis," but it is remarked by others, that "a skeleton so susceptible, is prone rather to the more common inflammatory products of caries, abscesses, ulcers and necrosis."

From the foregoing, and also from all attainable authority in relation thereto, I think you will agree with me that the first or original cause of Exostosis is exceedingly obscure; or rather, as is more probably the case, that the cause *may be* chargeable to *any* or *all* of the various causes of inflammation. In short, it is among those things not yet definitely determined; for when we say that irritation is the cause, we are only *approximating* the facts of the case. It would be as reasonable to say that irritation or inflammation is the cause of alveolar abscess, which is true; but in order to successfully *treat* the same, we must know the *cause* of the *irritation.*

In its diagnosis, we also find ourselves nearly as much in the dark as before. In the early stages of the disease particularly, it is usually marked by no well-defined symptoms.

In its incipiency its inconvenience is so slight that it is hardly noticeable, except that frequently the patient is made simply aware that he *has* a tooth, occasioned by a very slight uneasiness or tenderness in connection with the offending member. There is no swelling or inflamed appearance of the gum at this stage. The crown of the tooth may appear to be perfectly normal and free from all signs of decay.

In other cases there may be slight neuralgic twitchings or dartings through the facial regions in *addition* to the above; or, these symptoms may be manifested in the *absence* of the sensitiveness of the tooth affected; in which case we are left still more in doubt and uncertainty. It is my impression that these neuralgic or sympathetic symptoms are the most common results; but they, after all, are but *suggestions* in the

diagnosis of the case, from the fact that they *may* be the result of numerous other causes.

In cases where we find the *neuralgic* symptoms, and also *sensitiveness* of the tooth or teeth present—the teeth otherwise appearing normal—we are generally warranted, I think, in attributing the cause to Exostosis, and perhaps we should *usually* be safe in thus deciding where the *sensitiveness* alone is present, especially in the absence of other causes more prominent.

From Tomes' last work I quote as follows: "When the disease arises in connection with caries, it is attended by a thickening of the gums, which assume a deep, dull color, and a disposition to bleed when subject to friction from the tooth-brush or food. But when the crown of a tooth is free from disease, Exostosis of the root may be unattended with any recognizable change in the condition of the contiguous gum. The occurrence of sympathetic pains in the head, face, or neck, may be, and often is, the only indication of disease.

In the presence of such pains it is often extremely difficult to determine whether the teeth are in fault, and if so, which tooth or teeth have occasioned the suffering. Sooner or later local symptoms may arise, by which the offender may be recognized. The tooth will become tender on pressure, or sensitive to the effect of hot or cold fluids, or the gum may become absorbed, and leave exposed the neck of the tooth, which eventually becomes loose.

Such obvious symptoms, however, commonly appear only after the patient has undergone great suffering from supposed "idiopathic tic-douloureaux" (by which expression I understand him to mean *facial neuralgia*), a complaint for the relief of which patients have submitted to have tooth after tooth extracted, although the relief afforded after each operation was but questionable."

Should the disease have extended, and the osseous deposit have become considerable, there will be a swollen appearance of the contiguous gum, unless, as is generally the case, there is a corresponding absorption of the alveolar wall of the socket. Therefore, in the *absence* of a diseased appearance of the gums, we are not, by any means, certain that we shall not find an extensive progress of this disease, and we may almost say, that upon all the symptoms cited in this paper, as well as upon all symptoms named by authors in general, we cannot rely with positiveness. In short, its diagnosis is often at least very difficult.

And if its diagnosis is difficult and blind, I think I may say, without

fear of contradiction, that its *treatment*, the fourth heading suggested in the outstart, is also difficult. True, we may resort to the usual treatment, and remove the offender, *if we can*, which in many cases requires considerable skill to accomplish. But the *true* office of the dental practitioner, is to *save*, not to *destroy*. It must be confessed, however, that our profession has not yet arrived at that degree of perfection that enables them to successfully cope with this very commonly presented disease.

One of the most frequently adopted means of treatment of Exostosis in general Surgery is that of the compress. It is so adjusted as not to destroy the intervening fibrous tissue, and necessarily very slight, applied somewhat after the manner of the truss. This treatment, I am informed, is very successful.

In other cases the muscles are dissected off, the abnormal deposits chiseled to due proportions, and the muscles, of course, replaced.

In connection with this mode of treatment in general Surgery, I beg to suggest that extosed teeth *may*, in some cases at least, be extracted, and the Exostosis amputated or filed off, and the tooth immediately replaced. I have never known it to *be* done, or before suggested even, but fail to understand why it *might* not be attempted with a good prospect of success. The pulp, however, should be removed, and its cavity filled before replacement. There probably would be more difficulty in keeping the tooth in proper position than is usually the case, but I know not why it should not ultimately become firm. The fact that teeth which have been removed from the mouth and afterward replaced do become firm in their places again, we all know. I can explain this only upon the theory that an osseous plasma is thrown out, which calcifies, and becomes impacked around the root of the tooth. I hope to be able to report the result of such an experiment at no very distant date.

Suggestions are given under the head of General Surgery as to *constitutional* treatment, such as tonics, the regulation of the diet, invigoration of the blood, etc., which are beyond the scope of this paper, and come more properly under the domain of the general practitioner.

THE manufacture of caoutchouc from milk-weed (*asclepias*) has been undertaken by a company in Canada with a capital of $100,000. The milky juice yields about four per cent. of caoutchouc.

[From Popular Science Monthly.]

ADDRESS TO AN ATOM.

BY AN UNCOMFORTABLY CONSCIOUS AUTOMATON.

Mysterious particle,
Intangible and most indefinite article,
Which even Science cannot fix or focus;
Are you indeed of all this hocus-pocus,
Mischristened Cosmos, protoplast? If so,
'Tis pity that the happy *status quo*
Of universal dumb inertia ever
Was broken up by vortices or voices.
'Twere surely better far that space had never
Re-echoed to objectionable noises,
Or witnessed all this pother
Of biologic bustle, whose chief law seems Bother!
Why could not you,
And all your fellow-motes, far, far too prankful,
In the embraces of the boundless blue
Rest and be thankful?
A plague on all your forces and affinities!
A mob of monads, to my notion,
Surpasses one of demons or divinities
Only while idle. With the earliest motion
Began the immitigable Mischief. Why
Must you in chaos cut those primal capers,
Which were "the promise and the potency"
Of—all the woes that fill our morning papers?
'Tis surely a reflection most unpleasant
To think that all the plagues which haunt the present
Spring from that moment in the hidden past,
When the first molecule, weary at last
Of immemorial motionlessness, stirring,
Jostled his neighbor Atom. What a whirring
Went through astounded Space!
Thought pictures a grim grin upon the face
Of him, the Prince of Evil;
Only that then, of course, there was no devil.
At least of the New Creed that's one prime article;
Though I have little doubt
He was incipient in that self-same particle
Whose fidgets caused the first great stirabout.

If Science's "dry light," at its meridian,
Finds men no more than automatic midges
In its cold ray, the history that bridges
The space between us and the first Ascidian
Were better blotted.
To archetypal atoms was allotted
An easier fate than to the complex mass
Of "clever matter," which has dared to pass
For man, but is, for all its prayers and panics,
A problem in molecular mechanics!
If conscience be but chemic combination,
And Love a mere molecular affinity;
What boots all Life's superfluous botheration
Of mad and painful dreams, that limn Divinity
On fool-projected limbos? Life's a swindle,
If taken *à la* Tyndall.
And, let who may in that demoniac war win
("Survival of the fittest!")—yet, as groping
Less anxiously, less fearing, striving, hoping,
An Ape was less a dupe than is a Darwin.
That Atom must be a misguided duffer
Who'd join a Co.; *alone* it could not suffer.
Why should it long for partnership and pain so?
I would *I* were a monad—I'd remain so;
And as for "nascent thrills" and "ganglia," drat 'em!
They're things for which I should not care—an Atom!

MUCOUS ENGORGEMENT OF THE MAXILLARY SINUS.

By W. C. Starbuck, D.D.S.

The liability of the Antrum Highmorianum to morbid affections, and its close proximity to the oral cavity, renders it highly expedient that the dentist should obtain a thorough knowledge of its locality and be prepared to apply the most suitable remedies for arresting the progress of disease and affecting an ultimate cure.

This expression of opinion is somewhat at variance with that of an eminent writer who thinks that "the treatment of diseases of the antrum hardly come within the province of the dental surgeon unless caused by decayed teeth;" but at the same time he suggests that "it

would be well for the dentist to be acquainted with diseases of this class and the symptoms by which they are distinguished."

Of the various diseases peculiar to the maxillary sinus, it is proposed to refer more particularly to one only, viz,: mucous engorgement. The mucous or pituitary membrane which lines the antrum, secretes, as is well known, a thin inodorous fluid, which serves the purpose of lubricating the cavity. In cases of inflammation of this membrane, from whatever cause, the secretions may be so increased as to lead oftentimes to serious complications and the final closure of the small opening which communicates with the middle meatus of the nose. As a natural result of this obstruction, engorgement may ensue; when this occurs, free egress should be given to the accumulation thus formed, and such injections employed as will tend to allay irritation and remove the exciting cause.

As a general rule, diseases of whatever nature yield more readily to treatment when taken at early stages; and this may be true in reference to affections of the antrum. When the diseases of this cavity are neglected or improperly treated, complications may arise which may so involve the surrounding parts as to cause their entire destruction. Ordinarily, there need be no apprehension of danger, as simple inflammation of the lining membrane may be readily cured; the treatment, of course, depending upon the constitutional health of the patient.

When a morbid action occurs in the antrum, and continues for any considerable period of time, the cure becomes doubtful, particularly if the adjacent bones of the face and nose are implicated. In a case where there is extreme susceptibility of the tissues to morbid impressions, originating from some hereditary predisposition or constitutional vice, an affection of the antrum might lie dormant for a long time and only become developed into a malignant character by a general derangement of the entire organization.

With some medical authorities, the terms mucous engorgement, abscess, dropsy and empyema are synonymous when used in connection with the antrum, and of the various causes assigned for these affections, the penetration of the base of the sinus by the apices of the roots of the molars or bicuspids appears to be the most general. That the roots of these teeth do sometimes penetrate this cavity is well known, and it is also equally a fact that both antra are often penetrated by them; but it does not necessarily follow that irritation is the result of such penetration, unless the teeth are in some diseased condition.

Other causes may be assigned for cases of irritation in the antrum,

and which may be frequently traced to blows upon the face, exposure to cold, or some constitutional disease. As a natural concomitant of irritation thus arising we have inflammation, often followed by suppuration. An altered condition and increase of the secretions of the lining membrane of the antrum resulting from inflammation and suppuration, when accompanied by obliteration or the closing of the nasal opening, must inevitably lead to engorgement. When this takes place the surrounding parts may possibly become so involved that an undue pressure may be exerted upon them, causing the accumulation to force for itself an egress, which it more frequently does through the cheek, assuming the form of a fistula.

Many cases of this description have been referred to the writer of this paper for treatment, and all were discharged cured. On one occasion the patient had been in the hospital for some weeks, the treatment there having consisted in the application of a little simple-cerate externally, and the insertion of a bit of stick to keep the fistula open!—no attempt having been made by those having the case in charge to look for and remove the cause of the disease. In eight days after taking this case in hand, the purulent discharge had ceased, the fistulous opening had closed, and the patient was dismissed. The treatment consisted in perforating the antrum at its base, followed by simple injections of warm water and subsequently of the following:

Tinct. Myrrh, 1½ drachms; Decoct. Hordei, 8 ounces.

In some of the other similar cases, which, probably from some constitutional predisposition, did not yield so readily to simple treatment, injections daily of one part of carbolic acid to eighty of water, gradually increasing its strength one-half, effected the desired result; the time employed for bringing about a cure varying from two to eight weeks, and in one instance eleven weeks were required.

In forming a diagnosis, great care should be used not to confound other affections with mucous engorgement, as it is often difficult to distinguish one from another; a purulent condition of the secretions of the maxillary sinus, indicative of engorgement, being recognized by acute pain in the sinus, an uncomfortable sense of fullness in the cheek, and the occasional formation in the malar fossa of a hard tumor-like prominence, and the mucous membrane by which it is covered; being usually red and inflamed. These prominences may sometimes be owing to a thickening of the bone, caused by chronic suppuration, and assume the form of an osseous cyst or tumor, and to ascertain the nature of these formations, an exploratory puncture should be made.

It does not always follow, when the nasal opening is closed, in a case of mucous engorgement, that the secretions find evacuation through the cheek, as the pus sometimes forces an outlet through the natural orifice and is discharged through the corresponding nostril.

There seems to be some difference of opinion among some authors, as to the causes of the various diseases of the antrum ; but the one usually assigned as the origin of engorgement is this : that it is produced by some alveolo-dental irritation, which ultimately results in the closure of the nasal passage. The close connection of the pituitary membrane of the nose with that of the antrum, would give the impression that inflammation in one would naturally extend and involve the other ; but such is not usually the case, although it may sometimes take place. One authority (Weber) states that "suppuration in the antrum may proceed from inflammation of the lining membrane, caused by the spread of catarrhal inflammation in the nasal cavities," while another says "that a morbid action is not frequently excited in the antrum by an unhealthy condition of the nose, and that although lined by one common membrane, the propagation of disease from one to another seldom happens." As inflammation often extends some considerable distance from the source of irritation, it may be possible, when occuring in the lining membrane of the nose, for it to reach and involve that of the antrum ; but this does not seem probable, from the fact, that the opening into the sinus is so very small. Simple inflammation may be readily diagnosed from malignant growths, as the latter usually pass rapidly out from the antrum and involve the surrounding parts, while the former, not necessarily of a dangerous character, may be slow in its progress and more readily cured.

Engorgement of the maxillary sinus does not seem to be so commonly confined to young people as has been supposed. The majority of the cases which have come under the writer's observation and care have been among persons nearer middle-aged.

Having correctly diagnosed a case of mucous engorgement, the first thing to be done is to give free exit to the purulent accumulations, and this can be done by perforation. This operation does not appear to be of modern origin, as Molinetti has the credit of having described an opening made into the antrum through the malar fossa, as early as the year 1675. Others have suggested perforating the maxilla in the canine fossa ; but the most suitable point appears to be through the alveolus of a molar tooth, as it is separated from the apices of the roots by a very thin partition of bone, the second molar being the one usually

chosen as being nearest the base of the cavity. Before deciding which tooth to remove, it would be well to examine all of the teeth situated directly beneath the antrum, and should there be one in a diseased condition, to remove that in preference to a sound one, provided the base of the sinus can be reached through the opening ; and even a sound tooth can be extracted if there are indications that its presence is productive of irritation.

The instrument best adapted for perforation is a straight trocar ; but in using it, the too sudden entering into the cavity, and the possible striking of the instrument against the floor of the orbit, should be carefully guarded against.

There are cases where the cavity is divided by a transverse septum of bone, and where a simple perforation might be followed by only a partial evacuation of the accumulations ; it has been shown, however, that the presence of such a septum is rather an exception than a rule.

The opening should be large enough to allow the easy exit of the retained fluids, and the free admission of such curative injections as the nature of the case may demand ; and it would be well also to give special attention to the general health of the patient, recommending, in addition, a change of diet if insufficient, to a more nutritious one, and the moderate use of tonics or stimulants if the person under treatment is in an anæmic or debilitated condition.

ON THE PRECAUTIONS NECESSARY TO BE OBSERVED IN THE USE OF AMALGAM.

By Thomas Burgh, D.D.S.

There is no material used for filling teeth which requires such peculiar care in its use as Amalgam. Of course it requires more skill for the use of gold, but there is more employment for close observation and for a careful attention to conditions, and for a knowledge of the properties of the material concerned, in the use of Amalgam, than in that of any other material. There are certain cavities in which a tolerable filling of gold, tin, or gutta percha, could be introduced in the most careless manner—in violation of all the rules requisite for the production of good fillings, but in which Amalgam, used under the same circumstances, would be worthless. But give to that class of cavities the best preparation which they are susceptible of receiving, and Amalgam, used under proper precautions, would make a better

filling than any other material. Such cavities are those frail, badly decayed ones, in the mouths of unmanageable people, particularly children. If they cannot be properly treated on account of the nervousness or intractability of the patient, they are better filled with tin, gutta percha, or even gold, (though the latter is not so preservative, *per se*, as either of the former), but if they can be properly treated, Amalgam, as a general thing, properly used, is the best material to use.

When, in the exercise of the judgment of the operator, he has determined to use Amalgam in any case, let us examine a few of the precautions which it would be well for him to observe.

The first consideration, then, is the preparation of the cavity. If it is necessary to remove all the decay for any other kind of filling, it is still more necessary for Amalgam. For the filling may possibly shrink a trifle, and, if it should leak, any decay enclosed would facilitate the progress of decay. The cleansing of the cavity should be most thorough. I do not mean to say that every particle of decay should always be removed from the vicinity of the nerve, where there is danger of exposure ; but from the main body of the cavity, and especially from near the edges, every particle of decay should be removed that it is possible to remove. It is hardly germain to the subject, but, for fear I should be misunderstood, I will say that, if I have reason to believe that a nerve is extensively exposed and diseased, both or either, instead of seeking to avoid uncovering it, it is generally my first object *to* uncover it, and destroy it. I cannot but respect practices which give definite and satisfactory results, and which have received the sanction of long experience. If, then, the nerve is in this condition, I destroy it. If I suspect but a slight exposure of a healthy pulp, and particularly if the decay grows more solid as I approach, I am very cautious in removing it. A pulp in this condition, however, requires to be protected from thermal changes. Amalgam, though not as good a conductor as gold, is yet a good enough conductor to destroy a pulp in the condition alluded to. To protect such a pulp I should employ a slight capping of plaster of Paris. As no particular strength is required in a capping in such cases, Amalgam being susceptible of being introduced without much pressure, plaster of Paris is strong enough not to be broken up by the introduction of the filling, and it is not so irritating as the oxy-chloride of zinc. The point, in such a case, is to avoid irritating the nerve ; for, if irritation is once set up, we can never tell what may be the finale. But if there is no danger of exposing the pulp, every particle of decay should be scrupulously removed. Decayed

dentine is infectious, and to leave any of it under the plug unnecessarily, is to add one more to the conditions by which fillings are assailed in every mouth.

With the cavity properly prepared, the next consideration is the preparation of the Amalgam. The most interesting question which occurs in this connection, is, "Ought Amalgam to be washed?" It is a question which I have heard occasionally disputed; but so beneficial did the practice seem to me, and so universal has been its adoption in this country, that I always considered it settled in the affirmative, until Mr. Fletcher, of England, recently condemned it as injurious. He says that Amalgam should never be washed under any circumstances, alleging that globules of water may be enclosed in the mass by doing so. Mr. Fletcher's conclusions are drawn from actual experiments, and are entitled to attention; yet they do not appear to me to be conclusive. I can readily understand how what he appropriately designates a dry Amalgam can retain water after being washed, because there is not sufficient mobility among the particles to enable the mercury to draw them together, and to displace any water which may have insinuated itself among them; but it does not plainly appear how an Amalgam which is wet enough with mercury to allow its attractive and solvent force to operate on every particle, can retain water in its substance. The attraction of the mercury is so great for the other metals, and such is its solvent power, that no water could get into the mass, or remain there if it got in. The mobility of the particles would be such that the water must be displaced, and driven to the surface.

None will dispute that the *object* of washing can be accomplished, viz.—freeing the compound from its oxides. This cleansing process is a great consideration, as far as the appearance of the plug is concerned. An unwashed Amalgam is often a dirty mess, and soon becomes unsightly. Not only does it turn darker, and sooner, than a washed Amalgam, but the tooth itself often turns black, as though it absorbed the mercury into its structure. It is reasonable to suppose that the oxides retained, augmented by additional oxidation as time progresses, penetrate the tooth. I have seen teeth which were filled with Amalgam many years ago, by a dentist who was in the habit of inserting unwashed Amalgam, and who used to controvert with me the propriety of washing, turn black through their whole structure, even the roots, and present a repulsive appearance. Of course the object of inserting Amalgam fillings is to preserve the tooth, and that practice which will best accomplish this is perhaps the practice to be adopted. But there

is a limit even to the consideration of utility, where the claims of appearances demand attention. Even if the superior preservative efficacy of unwashed Amalgam was indisputably established, it would still be a question if it were better to insert such unsightly fillings, to omit physiological considerations, rather than more sightly ones of inferior preservative qualities. But the superiority of unwashed Amalgam is far from being established. The very objection urged against washing—that water is insinuated into the Amalgam—is, as I will endeavor to show, self-creative; whilst, even if it were not so, the absorption of the oxides of the unwashed plug might give more esthetic offense, and involve more danger to the periosteum, than the superior preservative qualities of the unwashed plug would do good. Those oxides are the material which penetrate the tooth, and they are inserted ready formed for that purpose; while in the unwashed plug it will take years to form them or their equivalents, the sulphides; and, in fact, they can never be formed to so great an extent, and so convenient for absorption, as in the unwashed Amalgam.

Yet I will not forget that my reasoning is more or less speculative, while the position examined appears to be deduced, as far as Mr. Fletcher is concerned, from actual experiment. Neither do I forget that Mr. Fletcher's experiments apply to the Amalgams which he manufactures, while my convictions relate to those used in this country, and particularly to Townsend's and Lawrence's Amalgam. Yet it may be discovered that his objection to washing applies to all Amalgams alike. So I do not consider the question settled, but regard it as a subject for systematic investigation. These investigations ought to be made by the manufacturers of Amalgams, who are better prepared, both by the routine of their occupations and the possession of necessary facilities, as well as by every other economical consideration, to conduct them, than the preoccupied and unsupported dentist. The expense could be readily added on to the Amalgam by any reliable manufacturer, who, in these times of fraud, could compete with the cheaper productions of unscrupulous parties. In the end it would redound to the advantage of both the manufacturer and the profession, as well as to mankind. Until such investigations have been systematically and thoroughly made, I shall continue to wash at least such Amalgams as I have been accustomed to use; testing the matter, however, in the temporary teeth.

In order, then, to wash Amalgam, enough mercury should be added to make the mass pliable and plastic, *but no more.* Any approach to

fluidity should be carefully avoided. Soap and warm water are as good as anything that can be used for this purpose—merely wetting the fingers with the soap, and washing in the palm of the hand. After it is thoroughly washed, to still further guard against the retention of moisture in its substance, it should be plunged into alcohol, which will take up the water, and secure its evaporation. But even if some water should still be retained, notwithstanding these precautions, the subsequent treatment must tend to express it.

After the Amalgam is washed, the excess of mercury is to be expressed. This, too, receives the condemnation of Mr. Fletcher, but what the nature of his objection is, I am not sure that he informs us. I can conceive of no objection, unless it is that some metals which are more soluble than others may be expressed with the mercury in imperfect proportion. Of course the mercury does not go out clear. It is in combination with the other metals, and some slight proportion of them will inevitably go out with it, and it may be that one or more of them will go out in undue proportion. In order to avoid any objection of this sort, I have always used as little surplus mercury as possible. But even if this objection is well founded, it is unimportant alongside of the manifest advantages of getting rid of the surplus mercury. It is the mercury which, on every consideration, is the objectional ingredient in Amalgam. It is mercury which does the discoloring, it is mercury which causes the contraction, and it is that which, according to the sapient homeopathist, rots the bones and ruins the constitution. To get rid, then, of as much as possible of this obnoxious element, is a very desirable thing.

The operation of expressing the mercury is a still further preventive against moisture being retained in the filling. How are globules of water to be retained in an Amalgam when the attractive force of the mercury is aided by the force of the pliers, and the particles are driven tightly together? The water, if not displaced before, or taken up by the alcohol, must be displaced now, and absorbed by the material in which it is compressed. The amount of mercury to be expressed should be regulated by the difficulties expected in the introduction of the filling—such as the position of the tooth, or the cavity, or inability to keep it dry long. When such difficulties are present in the extreme, the Amalgam should be merely twisted by the fingers in the buckskin used. If the filling can be easily introduced, and with sufficient deliberation, it should be pressed with the pliers more or less hard, according to the difficulties anticipated. The amount of mercury to be

expressed is to be regulated not only by the difficulties attending the introduction of the filling, but also by the circumstance of whether there are any of the walls of the cavity gone, and it is deemed necessary to restore the original contour of the tooth. In such cases, if a very dry plug is used, it will be found very difficult to add on the unsupported portion, and if the operator should succeed in doing so, by the most careful manipulation, he will often find that the cohesion was so slight that this portion has fallen away before the filling hardened. If the cavity is a simple one, and favorably located, such as in the grinding surface of the lower molars, I give the Amalgam its maximum amount of pressure, sometimes expressing all the mercury I can with the pliers. In a paper which I wrote some ten or twelve years ago on this subject, I said that I sometimes put my Amalgam in the vise, and the amount of force which I applied can be measured by the fact that the towels which I used for the purpose were crushed into holes. But I found so much difficulty in using so hard an Amalgam, that I gradually fell out of the habit. I could also fill a large class of cavities with gold easier than I could with so hard an Amalgam, and I discouraged its use in such cases. If, however, I were deprived of gold, and could not use it, I should use this hard Amalgam quite extensively. It made excellent fillings, and did not discolor to any great degree.

Another reason, and, to my mind, an important one, why Amalgam should be used as dry as the particular case will admit of, is drawn from the very observations in which Mr. Fletcher says that Amalgam should not be pressed. He says that, among other properties which Amalgam possesses, it has a tendency to assume a spherical form, and consequently to draw away from the angles and edges of the cavity. Any one at all acquainted with natural philosophy knows the reason of this. It is not peculiar to any particular form of matter, but is its universal property, from a grain of sand to a sun. It is not the result of chemical action, but of molecular attraction, which tends to draw every particle of matter to a common centre ; and the condition required for its operation is fluidity. In proportion as matter approaches the fluid condition, other things being equal, will it assume the spherical form, and in proportion as it approaches the solid condition will it retain any particular form in which it may be placed. A molten mass thrown off from the sun, or a drop of water from a grindstone, or a bit of molten lead dropped in a shot tower, will instantly assume the globular form ; but if the mass thrown off from the sun be solid, or if a grindstone throw off a piece of its substance, instead of a drop of water, or if a bit

of solid lead be dropped in a shot tower, neither of these will change in the slightest degree the form in which it was thrown off. Why should this be? The force of molecular attraction in any of these substances is the same, whether they are solid or fluid. Why, then, should any body preserve a given shape when solid, and assume a more or less spherical form when fluid? Simply because the friction of the atoms of a solid body is too great to be overcome by the force of attraction. But when the solid body is rendered fluid by heat, or otherwise, the friction is removed, freedom of motion is established, and the particles yield to that force which draws them to a common centre. It is precisely the same with Amalgam. When we are told that Amalgam tends to assume the spherical form, the inference is plain—that it is used in too fluid a condition. There is not enough mercury pressed out of it. In proportion as the mercury is expressed, in that proportion will it be unaffected by molecular attraction, as well as by chemical changes. Make the Amalgam so dry that molecular friction is established, and there will be no perceptible change of form occur through molecular attraction.

After the Amalgam, then, is thus properly prepared, the next thing to be considered is its introduction into the cavity. In this stage of the proceeding, that which is of first importance is the dryness of the cavity. If this cannot be secured, throw away your Amalgam, and fill with most anything else. So great an antipathy have I for moisture, in this connection, that I am cautious to introduce the Amalgam at about the same temperature as the breath, that no moisture may condense on it. I also warm the instruments with which I introduce it, particularly if the temperature of the room is a little low, so that the instruments are cold. Under such circumstances, the instruments should always be warmed, no matter what may be the filling used, until they are warmed either by the temperature of the room or by handling. It frequently happens that, on a cold winter's morning, the instruments are much below the temperature of the room, having been enclosed in the drawers while the room was warming. In order to determine whether any moisture will condense on them it is only necessary to carry a cold polished instrument to the mouth, when it will be instantly dulled by a film of moisture, which is sometimes so heavy that it cannot be wiped off on the fingers. To introduce a metal so dense as Amalgam, with large pointed burnishers and pluggers, cold, would be to carry a good deal of moisture into the filling with certainty. I warm my Amalgam and instruments over a lamp. It

would be better, however, to have a simple apparatus which would warm the Amalgam at a uniform temperature of about blood heat. I sometimes use the rubber dam, also, to keep Amalgam fillings dry, with the same care that I would for gold fillings.

[*To be continued.*]

CHLOROFORM CONDEMNED.

By J. HARDMAN, D.D.S., Muscatine, Iowa.

The question of the moral justification in the use of chloroform for general anæsthesia, in dental and surgical practice, has often had its claims forcibly impressed upon us. Should we, as a profession, having the entire control of the patients placing themselves unreservedly in our care for treatment, use so deadly and so treacherous an agent as chloroform has proven itself to be? For over twenty years since, we have ourself refused to use this agent for anæsthesia. Our convictions were, and remain the same, that no security against its fatal tendency is known; no reliable rules by which to select a subject exempt from its deadly influence; no antidotes efficient, or means of resuscitation deserving of much confidence.

We took occasion, in a paper we had the honor to read before the Iowa State Dental Society in 1867, (and which was published in the *Dental Register* of Jan., 1868,) to state somewhat in detail our views in regard to this subject.

It is gratifying to see that the profession in the State of Massachusetts are moving in the right direction, as is indicated by the following clipping from the *Press*:

"The Massachusetts Dental Society has passed resolutions emphatically condemning the use of chloroform as an anæsthetic, and declaring any member administering it liable to expulsion."

This has the correct ring, and shows morality coupled with enterprise.

At the last meeting of the Iowa State Dental Society, we presented the following preambles and resolutions:

"*Whereas*, the frequency of death caused by the use of chloroform as an anæsthetic, is justly exciting apprehension and alarm in the people; and

"*Whereas*, after protracted years in its use, no security against its deadly tendency, either in the mode of its administration or selection of subject has been developed; and

"*Whereas*, no truly respectable profession should ignore the value of moral rectitude in practice, should with impunity hazard the lives of its patrons, or heedlessly disregard the intelligent warnings of statistical record ; therefore

"*Resolved*, That we, the members of the Iowa State Dental Society, condemn the use of chloroform for the purpose of general anæsthesia, and will refrain from so using it in our practice. And moreover, we will use our influence to favor its entire expulsion as an anæsthetic agent."

The discussion of this resolution elicited the too prevailing fact, that many dental practitioners go forward without pausing to reflect as to the moral responsibility that should and must accompany the conduct of the dentist apart from mere expedience. The comparative exemption from legal accountability, in connection with its very general popularity, are cited as evidence that no great amount of crime can attend its use. But more frequent penalties, such as was obtained by the estate of J. W. Lawrence, of Floyd County, Iowa, against Dr. C. C. Birney, in which the jury found a verdict of $1,750 for malpractice, in using chloroform on the deceased to a fatal termination, will probably be the only means of arousing a just apprehension of this subject.

The above resolution was laid upon the table, and will again be called up, when, it is hoped, that our Society will place its condemnation upon this sad practice by an unanimous vote, establishing, by so doing, its well merited position of dignified honor.

We have no especial object at this time save to put in the minds of the friends of true principle, correct conduct and dignified humanity in our profession, to concentrate their efforts and influence to the breaking up of this dangerous practice in the use of chloroform.

We trust that at the dental conventions which may meet for deliberation during the present year, all may take a decided action in this matter, to the end that the showing will be emphatically in favor of abandoning its further use.—*Dental Register.*

Malleable Glass is ordinary glass so perfectly annealed as to have lost all its brittleness. It has been recently patented in all the principal countries in the world, and a company organized in Paris for its manufacture. From careful tests made it seems to be all that is claimed for it, and will doubtless be of much value in making lamp-chimneys, flasks, and retorts, as well as the many other numerous uses for which glass is employed.

SMOOTH VERSUS SERIATED POINTS—GOLD.

By W. Irving Thayer, D.D.S., Brooklyn, N. Y.

In the spring or summer of 1872, Dr. George H. Mills, of Brooklyn, now of Hartford, Conn., presented for my inspection some half a dozen different shaped smooth pointed pluggers.

These were the first I had ever seen, heard, or thought of, and were almost immediately condemned by me. I had conceived the erroneous idea, that it was absolutely necessary to have *very fine* seriations on the point of each of my pluggers. Dr. Mills might succeed in *jamming* some gold into favorable positions, but as for myself, I was too conceited to imagine even that Dr. Mills could *unite* the atoms of different pieces of gold together, while I knew I couldn't; 'twasn't possible. Really, I have learnt that it is even possible for me to be mistaken sometimes, and now I know I was in error in my opinion that the *union* of the separate parts of a gold filling was impossible by the use of Dr. Mills' pluggers. Almost every operator has sometimes found that his gold did not or would not unite to that which had been consolidated before; and upon careful examination has found a *little moisture* on the gold already impacted; *gold that is pure, kept absolutely dry, will unite well with other gold that has been impacted under the concussions of smooth pointed pluggers.*

I believe some of the advantages of smooth points are these. There is not as much danger of chipping frail walls when packing gold over their edges, as there is in the use of roughened points. Smooth points will not leave as many pits, perhaps none in the condensed gold. I have observed that a too frequent traveling over the same ground destroys the adhesive *(sticky)* quality of the impacted gold.

I would not in the least intimate that the operator ought not to *thoroughly impact* his gold, but there is danger of too much packing, (which burnishes the gold) either with smooth or seriated points, during the consolidation of the whole operation; not the final burnishing, but during packing of each piece.

My experience has taught me that it is necessary to have *absolutely pure* and *soft gold.* I choose in thickness No. 3 to No. 4, but use some No. 10.

I prefer to receive my gold without previous annealing. Manufacturers who furnish adhesive or cohesive foil anneal too much, and hence produce a harsh, rattling mass.

Many operators apply too much heat to their gold, thereby melting

portions of it, making it as rigid as the back of the Rocky Mountains, instead of just warming it, when it will be adhesive, and feel like lead under the instrument.

Gold should not be cut after it has been annealed, as the divided ends are pressed together and adhere, giving the operator an uneven pellet to manipulate with. If swamp-angles get into one's gold, *generally* they come there either through fire or water ; more frequently from *ignis*, provided the gold is pure. Dr. Barnum's dam will effectually keep back the floods, but how, save by caution, will one keep back the fire ? *Pure gold will always work soft and adhesive if only slightly warmed.*

NEW APPLICATION FOR THE SPECTROSCOPE

If the spectroscope is valuable and efficient in matters celestial, it is not less so in matters terrestrial. For tests and analyses as a laboratory instrument, it becomes every day more serviceable. One of its applications is well worth notice—in testing the quality of water. In some places the water is found to be injurious to health. It is perhaps contaminated by infiltration from a sewer or cess-pool. How is this infiltration to be discovered ? A quantity of salt of lithium is thrown into the sewer or cess-pool. After a time the drinking-water is examined by the spectroscope. If the "lithium line" appears in the spectrum, it is a proof that a portion of the lithium salt thrown into the sewer or cess-pool has found its way into the drinking-water, and that the water is consequently poisoned by foul drainage. From this we see that the spectroscope may be made to do good service in protecting health.

UTILIZATION OF PINE LEAVES.

Pine leaves are largely utilized in Europe. They are converted into a kind of wool, or wadding, which is used for upholstery, instead of hair. A kind of flannel is also made from this fiber, which is said to be very superior for many hygienic uses, as for rheumatism, or skin diseases. Vests, drawers, loose shirts, etc., are also made of this material. In the process of manufacture an ethereal oil is obtained, very useful as a solvent and as a curative agent. Gas is made from the refuse, and used for lighting the manufactories ; or the entire refuse may be pressed in the form of bricks, when it becomes an excellent fuel.

NOTES.

New Base for Teeth.

Dr. W. C. Barrett, of Warsaw, N. Y., President of the Dental Society of the State of New York, has just shown us a new base for artificial teeth, which, while it resembles rubber in all desirable points, seems to have some advantages over that base. The inventor asserts that it may be colored to imitate the gums, without admixture of a compound of mercury. It is a wonderful susbstance, and if the statements made by the inventor are accurate, is likely to be largely used in the stead of rubber. It is produced by an inexpensive process, from the *Euphorbia Corollata*, or common milk-weed. The first set of teeth vulcanized on this base Dr. Barrett made himself, and exhibited to us. A meeting of well known members of the profession was called at the office of Dr. O. E. Hill, of Brooklyn, and several sets, one of them put up by Dr. Hill, were shown. Though the base is entirely new, and its properties imperfectly understood, and though no one of those who used it had had any previous experience with it, every set attempted was a success, closely fitting the plaster mold. The base seemed to be even stronger than rubber. We are promised a description at length for our next issue.

The inventor asserts that it will relieve those who use it from liability under the claims of the Cummings Patent.—Ed.

To the Dental Profession:

We, the undersigned, appointed a committee from the union meeting of the Seventh and Eighth District Dental Societies of the State of New York, to examine and report on the claims and merits of a new substance, called Lamb's Vulcanized Water-proof Gum, to be used as a substitute for rubber, in the manufacture of Dental plates, and for all other uses to which rubber is commonly applied, beg leave to report as follows:

That we have examined the material presented, have vulcanized it, and tested it as far as the limited time permitted, and believe it to be superior to rubber in many of its characteristics, and in every respect its equal.

Competent legal talent has to our knowledge pronounced the patent incontestible. We therefore recommend it as eminently worthy of the attention of every dentist.

G. C. Daboll,
W. C. Barrett, } *Committee.*
A. P. Southwick,

Shortening Teeth.

Editor Dental Miscellany:

Dr. Kingsley, in reporting a case of dental irregularity treated by him in 1861, and published in Feb. (1875) No. of Miscellany, says:

"So far as I am aware, this was the first effort ever made to shorten teeth by retreating them within the jaw, where they had become elongated through natural or developmental causes. This occurred in 1866, and was reported at the May meeting, in that year, of the New York Dental Society, and published in the *Dental Cosmos*.

The success in this case involved absorption of the walls of the socket, and is not to be confounded with some cases which I have seen since reported, where a tooth had become elongated by accident, as, for instance, the presence of a rubber ring around the neck of the tooth, and pressure was resorted to, to restore it."

The claim of precedence here made in respect to the date of the operation is

granted. The second paragraph, however, would seem to imply that the operation here resorted to was not only the first, but the only one, ever employed for the purpose indicated.

If Dr. Kingsley will refer to the July (1873) No. of *Dental Cosmos*, he will find a case reported by myself, in which the superior lateral incisors were shortened fully a line by forces applied to these teeth on a line with their long axes. Not then knowing of Dr. Kingsley's case, I supposed my own to be the first one of the kind attempted, and so spoke of it in the report.

I regard the operation as altogether practicable. My only apprehension was, that compression of the nerve and blood-vessels at the apex of the root might endanger the vitality of the teeth operated on; but such a result did not follow in my own case. Gradual retraction of the nerve and blood-vessels probably follows absorption of the walls of the socket.

JOSEPH RICHARDSON.

Terre-Haute, Ind.

Emission of Carbonic Acid by Leaves.

The phenomena of decomposition of carbonic acid by leaves under the influence of light are well known. The inverse phenomena, namely, the absorption of oxygen and the emission of carbonic acid in the dark, has attracted much less attention. MM. Deherain and Moisson have just communicated to the Paris Academy an interesting memoir on the subject. They find from experiment that the quantity of carbonic acid emitted by leaves is comparable to that furnished by cold-blooded animals; frogs give, in respiration, a quantity of the gas much below that from leaves of tobacco, or mustard, or sorrel. The quantity that leaves emit increases with rise of temperature, and at 59° F. the respiratory activity of silk-worms is comparable to that of decayed leaves at 86° F., but considerably higher than these manifest at 59° to 68° F. Leaves kept in the dark, moreover, absorb oxygen greater in volume than the carbonic acid they emit, and they continue to emit carbonic acid in an atmosphere deprived of oxygen.

Something New about Sand.

According to M. Beaudemoulin, if a quantity of dry sand be placed in a box of thin sheet iron or even in a canvas bag, and subjected to a slight compression, it forms a mass capable of resisting a pressure of fully 60 tons without breaking or even straining the envelope. The sand, however, remains perfectly divisible, so that if a small hole be made in the box or bag it will flow slowly, and with so little force that even a small piece of paper pasted over the opening will check the flow, even with the 60 tons' weight upon it. M. Beaudemoulin thinks this discovery of his may be utilized for building purposes, since the filled boxes need merely be held in place by a framework; while, being very thick, they would form a protection, in case of being used for dwellings, against variations of temperature. Such walls, besides, would be fireproof. It is also suggested that for lowering heavy weights, or even entire buildings, which, by a change of street levels, have been left too high above the roadway, the sand bags could be placed beneath and their contents allowed gradually to escape, thus letting the load slowly settle down.

A Glycerine Thermometer.

This instrument, suggested by A. Jaksch, of Bohemia, is made as follows: An ounce bottle is two-thirds filled with glycerine of any desired color, and the bottle placed in a freezing mixture of sal-ammoniac, saltpetre, and water, so as to cool the liquid to 32° F. A glass tube

twelve to fifteen inches long is passed through a good-fitting cork, so as to dip nearly an inch into the glycerine. The cork is inserted in the bottle and rendered air-tight with sealing wax or a cement of varnish and chalk, and the thermometer is then ready to be graduated. On inserting the cork, the liquid rises in the tube a few inches. The bottle is placed in melting ice, and the level of the liquid marked 32°, if the scale is to be Fahrenheit's. It is next placed in warm water, say at 132°, and this point marked. The space between these points is divided into one hundred equal parts, and this division carried down to the Fahrenheit zero, and upward to the top of the tube.

The Carrier Pigeon.

The traveling pigeon never stops to take nutriment, and often arrives at its destination thin, exhausted, and almost dying. If grain be presented to it, it refuses, contenting itself with drinking a little water, and then sleeping. Two hours later it begins to eat with great moderation, and sleeps again immediately afterward. If its flight has been very prolonged, the pigeon will proceed in this manner for forty-eight hours before recovering its normal mode of feeding.

Use of the Actual Cautery.

The "actual cautery" is commonly defined to be a *red-hot* iron used for burning or disorganizing the parts to which it is applied. The application of a red-hot iron directly to the living tissues is justly regarded as an extremely painful operation; but, if the iron be heated to a *white heat*, it is absolutely painless. The difference between the two is analogous to the difference between a bullet speeding at its maximum velocity, which may produce mortal injury without pain, and a nearly-spent bullet, which slowly lacerates the tissues, and causes agony. Dr. J. S. Camden, writing in the *Medical Times and Gazette*, recites as follows his own experience with cauteries at different degrees of heat: "When actual cautery," says he, "is to be used, the iron must be heated till it is really of a white heat, and looks almost as white as white paper. If then applied it destroys the part instantaneously, giving no pain; but it must be removed quickly on the heat decreasing, and then another iron employed. If a red-hot iron only is used, the agony is intense. The first time I saw the cautery used, on a girl of fourteen years, no pain was given; the second time, on an elderly person (both for fungus in the upper maxillary bone) her screeching was fearful, till I told the operator his irons were not half hot enough. He requested me to heat them properly, which being done, not a murmur was heard. The last time was opening four or five sinuses in a horse's shoulder. He never flinched, and scarcely seemed aware of what was being done. I would suggest using—to obtain the white heat for actual cautery—a large spirit blow-pipe."

[*Popular Science Monthly.*

American Sulphur.

One of the most remarkable deposits of native sulphur, as yet discovered, is a great hill composed of the almost pure article, found some two years ago at a distance of thirty miles south of the Union Pacific Railway, and nine hundred miles west of Omaha. This marvelous deposit is found to consist almost wholly of sulphur, containing only 15 per cent. of impurities. The best deposits heretofore available are those found in Sicily. The principal supplies for the manufacture of sulphuric acid come from there: the deposits contain 34 per cent. of sulphur. Our Western sulphur hill, therefore, is much the most valuable, and promises to become ere long of great importance to the country.

JOHNSTONS'

Dental Miscellany.

Vol. II.——*MAY, 1875.*——No. 17.

TRANSPLANTATION.

From Transactions of the Odontological Society of Great Britain.

The caricature which forms the accompanying illustration was presented to the Odontological Society some years ago by Mr. Statham, and is of such interest as a record of a long-abandoned operation, that no explanation of its appearance in the pages of the "Transactions" is needed.

It was executed in 1787 by Rowlandson, a very famous caricaturist, who died early in the present century, and has been reproduced with great fidelity by Messrs. Wyman, a matter of some little difficulty, for the accuracy of the outlines has been secured by the aid of photolithography, a process which alone would have given a paltry, unsatisfactory picture, owing to the coloring and to the staining of the paper by age.

The picture tells its own tale, and records many of the features of the operation as it was then performed.

In order that no time may be lost in the transference of the tooth, the lady of fashion sits side by side with the ragged boy from whom the "scion tooth" is being extracted. On the right a second operator is in the act of adjusting the transplanted tooth in the mouth of another lady; while behind them an old man admires in a looking-glass his mouth, in which the operation has apparently been completed.

Going out of the door are two ragged young persons, one of whom is contemplating the coin lying in the palm of her hand, which she has received in compensation for the loss of her tooth.

On the door is inscribed, "'Most Money for Living Teeth," and on the wall hangs a framed document, on which we read,—

"Baron von Hoh———,
Dentist to her Imperial Mightiness,
The Empress of Rusia (*sic*)."

The operation of direct transplantation of teeth, a freshly-extracted "scion" tooth being inserted with the least possible delay in the socket from which an unsightly tooth had just been removed, is described by John Hunter with some little detail, and in terms which would lead one to suppose that it was something of a novelty in his time.* The fact that it should have been made the subject of a caricature by Rowlandson, and the gist of some passages in the pages of Hunter and other writers, seem to indicate its having been practiced with considerable frequency; so that it had become well known to the public, and was not a mere curious experiment, performed by a few practitioners only.

Nevertheless, although it seems to have come rapidly into favor, its popularity was very short-lived, for, in 1810, we find a writer speaking of it as quite abandoned.

The manner in which the operation was performed we may gather from Hunter's work,† of which contemporary writers made very free use, as is indicated by internal evidence in their own books:

"A fresh tooth, when transplanted from one socket to another, becomes, to all appearance, a part of that body to which it is now attached, as much as it was of the one from which it was taken; while a tooth which has been extracted for some time, so as to lose the whole of its life, will never become firm or fixed; the sockets will also in this case acquire the disposition to fill up, which they do not in the case of the insertion of a fresh tooth.

"The scion tooth, or that which is to be transplanted, should be a full-grown young tooth; young, because the principle of life and union is much stronger in such than in old ones. It will be scarcely necessary to observe that the new teeth should be perfectly sound, and taken from a mouth which has the appearance of that of a person sound and healthy; not that I believe it possible to transplant an infection of any kind from the circulating juices, although we know from experience that it may be done by a matter secreted from them."

* Hunter was born in 1718, and died in 1783.
† "The Natural History of the Human Teeth." By John Hunter.

While insisting on the necessity of the tooth fitting accurately, or rather being a little smaller, he adds :

"The best remedy is to have several people ready, whose teeth are in all appearance fit ; for if the first will not answer, the second may. I am persuaded this operation has often failed from a tooth being forced in too tight.

"It will be hardly necessary to mention, that the sooner a scion tooth is put into its place the better, as delay will perpetually lessen the power upon which the union of the two parts depends."

The following extracts from contemporary writers will serve to indicate the opinions held of the operation at the date of the publication of the caricature :

"Thus much being premised on the patient's State : If the Dentist makes a proper choice of the Tooth to be transplanted, and takes it from a young healthy* Person, and conducts himself through the Operation with Judgment and Dexterity, the Patient may expect Success, equal to his most sanguine Wishes."†

"A dead Tooth, when properly prepared, has been found to fasten as firmly, and to endure in some Instances, for near as long a Time, as a Tooth taken immediately from a living subject."

Elsewhere the writer gives his charges thus‡:

Transplanting a living Tooth	£5	5
Ditto a dead Tooth	2	2

Berdmore speaks of the operation in less favorable terms, as exemplified by the accompanying extract :

"The few instances in which they succeed surely are not sufficient to counterbalance the hazard ; and were these people properly versed in the dentist's art, they would certainly prefer the healing of the socket, and the use of a well-constructed artificial Tooth, or a human Tooth with the root filed off, and formed to fit the void place exactly ; For

* "The Subject from whom Teeth are taken for this Purpose cannot be too strictly and closely examined, as Experience warrants the Assertion, that the Venereal Virus may be communicated by this Means."

† "A practical Essay on the Human Teeth, to which is subjoined an Appendix, exhibiting the Author's Charges for the several Operations he performs. By Paul Eurialius Jullion. 1781"

‡ As a standard by which to estimate the relative expense of the operations, the following extract from his charges may be added :—

Filling with Lead	£0	5	0
Ditto with Gold	0	7	6
A complete Set of *Human* Teeth with Gold Springs	73	10	0
Pivoting a Tooth	2	2	0

this will occasion none of the evils that attend the former practice, which is not only precarious, ineffectual, and dangerous in general, but also immoderately expensive; for it is not to be supposed that any young person will sell a handsome sound tooth, to be torn out of his head, without being extremely well paid for his loss and pain.

"In many instances, where this transplanting of Teeth has been thought to have succeeded well, I am of opinion that a new crown has been grafted to the old root, or the extracted Tooth has been replaced; and the patient has been made to believe that a new Tooth, extracted from another person for the purpose, is placed and made to adhere in this manner."*

Even in 1783 the operation seems to have been upon the wane, and Wooffendale† mentions the frequent occurrence of gum-boils, and other objections to it:

"The transplanting of teeth is a desirable operation, when it succeeds; but it may not be improper to observe, that its success in a great measure depends upon chance;" adding, "There is an operation I have frequently performed with success, though not always. It is, when a tooth gives pain, and the nerve cannot readily be destroyed, to take the tooth out, stop the hollow with gold, and replace it." "Having this operation performed carefully, the tooth so replaced will often answer as well through life as if it had never been diseased."

In 1810, it is said,‡ "It was once a very popular practice to substitute a complete tooth in the place required." "When it succeeded, the transplanted tooth in general remained only a few years; from such circumstances it gradually sunk into disuse, and is now, we hope, consigned to its merited oblivion."

Although it is exceedingly unlikely that the operation of Transplantation will be again in any form revived, there is something to be learnt from the fact that teeth so treated did in many instances become secured in their new sockets.

Thus in the operation of immediate torsion, regarded by many practitioners as so hazardous that they never resort to it, a far less degree of injury is inflicted upon the socket than by an extraction with the old rude instruments; even supposing the worst to happen, and the nerves

* "A Treatise on the Disorders and Deformities of the Teeth and Gums. The whole illustrated by Cases and Experiments. By Thomas Berdmore, of the Surgeon's Company, and Surgeon-Dentist to his Majesty. 1768."

† "Practical Observations on the Human Teeth. By B. Wooffendale. 1783."

‡ "A Popular Essay on the Structure, Formation, and Management of the Teeth. By John Fuller, Surgeon-Dentist. 1810."

and vessels at the apical foramen to be torn or obliterated, the tooth has a vastly better chance of reunion than a transplanted tooth could under the most favorable circumstances possess.

In Hunter's famous experiment, vascular communication was re-established with the tooth-pulp, in a tooth which had been transplanted into the comb of a cock.

The ordinary cause of failure in transplantation appears to have been alveolar abscess. But it is noteworthy that Hunter, although speaking of transplanted teeth as being occasionally ejected by the entire absorption of their root,* and as being liable to decay, makes no mention of their liability to blackening or discoloration ; so far as it goes, this omission points to vascular communication with the pulp having been sometimes re-established, so that the pulp did not perish.

CHRONICLES.

CHAPTER II.

Now, after many days, certain men in the land of the Gothamites, who had banded themselves together into a band called the District Band, were moved with envy at the Odontologs ; and they said among themselves, "Behold, we, too, will gather our friends together in council, and will issue programmes, and will call upon distinguished ones from afar, and will eclipse the Odontologs, and get great glory unto ourselves." But, in all this, they said not, "We will seek the truth," neither did they strive with much labor and pains for the good of their craft, but they sought for glory. And John, who was called the ambler, being a man of large heart, and being possessed of this world's goods in abundance, did open his house unto them ; and he said unto his friends and neighbors, and unto all the tribe of the Odontologs, "Come up, I pray you, unto my house, and be ye welcomed there, and ye shall eat and drink, and shall be filled with the good things of the land." Now John was possessed of a large heart and a generous corporosity, and it was acknowledged among all his people that he was well-favored. And all the people and all the Odontologs remembered how that John had fed them when they were

* In the Museum of the Odontological Society there are two specimens of replanted teeth which have thus lost the greater part of the fang. The one was a stump carrying a pivot tooth, removed on account of prolonged and incurable periosteal inflammation, and replaced rather as an experiment (it was retained some time, but never became very firm) ; the other, a wisdom tooth, extracted for the purpose of filling, filled, and replaced by a practitioner who claimed to be the originator of Replantation. The absorption of the fangs necessitated its removal some six months later.

weary and an hungered as they were journeying, and were cast away at Dobbs Ferry. And he fed them on the fat of the land, which was cream, and he garnished it with strawberries.

Now John is a poet born, not made, and when the spirit seizeth him, he needeth but some Saratoga water to set him going, and one can then "hear the wheels of his vitality within him humming and whirring like the overwrought works of some busy manufactory!" And there floweth from him verses in great abundance, and there continueth a flow until his health is re-established. And at these times he delighteth to gather around him his friends and kinsfolk, that they may all rejoice with him at his deliverance. And his gratitude to them knoweth no bounds, and on one occasion he did present to every man who heard him through, and who deserted him not until his paroxysm was over, a chain of gold and a watch, with an inscription thereon, which did make them all to rejoice.

And on the appointed day, the people were gathered together, but they were few in number and feeble in purpose. And he who was set to rule over them, threw down the Gage after this fashion:

We all love our profession, and wish its advancement. Now, unrequited love is said to be the toothache of the soul, but a little gold filling usually stops it. We will therefore proceed to discuss this question by listening first to a paper on antra, for, saith he, this subject doth intimately concern us. And a young medicine man who was bidden, arose, and essayed an essay on Phthisis, and the effect upon the people was great, insomuch that they began to go out, beginning with the youngest, and with all them that had no interest in molecules; and of those that were left, some fell into slumber; other some ruminated on the vicissitudes of human life, and the possible connection between the subject announced and the paper read. And when the paper was ended, one of the elders, also named John, and called for short "Uncle John," was moved with pity; "for," saith he within himself, "this young man hath spent his strength and labor in copying out this paper, and no man encourageth him by discussing it. I, too, once wrote a paper, and can feel for him." Then he arose and said, "Men and Brethren, of the substance of this paper I know nothing, neither do I understand the subject of which it treats, so that I have really nothing to say about it, for 'Blessed are they who have nothing to say and who cannot be persuaded to say it.' But, brethren, time is given us to be improved; therefore I thought to speak a few words unto you about grain and the phosphates. We are gathered to talk about 'Love being the tooth-

ache of the soul,' and the best method of preventing it. Now, the best way to prevent it is to *prevent* the decay of the teeth. How? I will tell you. Americans all live on fine flour; they must have the whitest of bread, or they are not satisfied; this is not the way of nature; the nitrogenous elements (I believe it is), of the atmosphere and the earth, produce first the blade, then the ear, then the full corn in the ear, and this gives us the necessary elements of the phosphates to form good teeth. The stalk also has its silex to protect itself withal, and the husk contains the elements of bone, and if we would only eat unbolted flour, our children would have good teeth and a rugged constitution, and there would be no further need of dentists."

This doctrine was so *new*, that it startled all hearers, and no man answered unto him.

Then the Raven arose, and croaking, said, Uncle John is right, but he should have gone further, and told us the rest: how that by eating unbolted flour, the grain trade would be promoted, the growth of our city would be augmented, our country would improve beyond conception, civilization would be extended to its uttermost borders, immigration would be attracted to our shores in vast multitudes, and specie payments would be resumed with the gold that would be brought over by these immigrants. Then a good constitution, such as has recently been adopted by this State, would prevent consumption altogether, which I believe was the subject of the paper under discussion, and this brings us back gracefully to the point whence we started.

And presently a sound was heard, and Hurd arose, and his head was white and glistening, and a halo glowed around it, and his face did shine with good nature and with soap, which he distributed among his brethren, and he spake gently to them, and rejoiced his heart to be among the boys once more. And he said he was happy at what he had heard, and happy that he was Hurd, and he would bear it as well and as gracefully as he could.

Then Barrett arose and said he too could bear it, and more too. He had heard what his friend Hurd had said, and greatly rejoiced in the progress his craft had made, and now, said he, Behold! we are great and mighty in our state organizations, and are doing much to elevate our calling among the brethren who dwell in country places. Now, therefore, I pray and beseech you who belong to the tribe of the Odontologs to give *us* your aid, and not continue to support so seditious an assemblage, and one whose influence for good must be so limited. And his words fell upon dull ears, and they hearkened not unto him, and the subject was no more discussed than had been the previous one.

And there arose a little Hill in the midst of the assemblage, a man of infinite humor, and he would fain have propounded the following question, to stir up the members withal : "Which is the butt end of a goat?" But nothing would they discuss save the eatables of their host, and his Dobbs Ferry sherry, which some of them soon got to calling Dobbs sherry ferry. And the doors were opened and they fell upon the tables and utterly routed them, notwithstanding they were manfully supported by the worthy host and his daughters. And Edward the Black was there. And John remembered what befell William, whose surname was Bronson, and the famished look he wore for many days after that he had once invited Edward to partake of his cheer, so he beguiled Edward with fair words, and he got him into a corner with an enticing speech, and he gave him a bottle to hold, and he raised his hopes high, but Edward was not wise in his generation, for he permitted the bottle to go out of his hands at the last, and he never saw it more. After this manner dealt the host with Edward, and so averted the famine, and his guests went their way filled and rejoicing as before, and the scribe departed and slept.

[From the Popular Science Monthly.]

THE CHEMICAL RADIATIONS.

By W. J. Youmans, M.D.

With that proneness to go wrong, which we notice in most things human, and which crops out in science as well as elsewhere, the art of making pictures by the chemical action of radiant forces has got a false name. This is all the worse, as it was at first correctly designated, and that too by him who had the clearest right to give the process a title. Davy and Wedgwood, early in the century, had labored to produce sun-pictures by means of the *camera-obscura*, but had met with but little success. In 1814 M. Neipce, of Chalons, in France, took up the subject, and, in the course of ten years' assiduous work, he succeeded in a method of forming sun-pictures on chemically-prepared copper, pewter, and glass plates, by which the lights, semi-tints, and shadows were represented as in Nature, and he also succeeded in making the impressions lasting. In 1827 he sent a paper to the Royal Society, accompanied with specimens ; but, as he kept the process a secret, the communication could not be received. The process, how-

[We are indebted to the courtesy of the Messrs. Appleton for the illustrations which explain this article.]

ever, he named *heliography*, or sun-drawing, a term by which it was truthfully characterized. M. Daguerre, another Frenchman, had been working at the same problem, and in 1829 these two men, with a common purpose, formed a partnership to carry on their researches jointly. Neipce died before the work was matured, and Daguerre, very naturally, reaped the honor of it. The French Government bought his secret, paying with a life-pension, and promulgating it to the world, without restriction of patent, in August, 1839. The new pictures were at once known as *daguerreotypes*, and the mode of making them the *daguerreotype process*. These uncouth terms endured for a while, but were at length supplanted by the word *photography*, or *light-drawing*, which has become established. Yet the appellation is incorrect, and the error is as broad as the difference between light and darkness. It is not light that makes the picture, but dark radiations that are associated with it, and that have the peculiar effect of producing changes in certain chemical compounds.

Although photography, in its wonderful development as an art, belongs to the past generation, yet the knowledge of the chemical effects ascribed to light is as old as chemical science. The subject began to be inquired into, experimentally, about 100 years ago. In fact, like most other modern chemical results, it had not escaped the notice of the alchemists, but, like everything else they discovered, it was subordinated to their mystical speculations. In the multiplicity of their manipulatory processes they stumbled upon a combination which they called *luna cornua*, or horn-silver, and which is now known as silver chloride. The alchemists knew nothing of its composition, but only that there was silver in it which had undergone a change. They noticed, however, that when this horn-silver was exposed to light it underwent a blackening, and, as they taught that "silver only differed from gold in being mercury interpenetrated by the sulphurous principle of the sun's rays," they concluded that this change, effected by light, was the commencement of the process by which silver was to be transmuted into gold.

It was in 1777 that the illustrious Swedish chemist, Scheele, published the first results of investigations upon the subject undertaken simply for the extension of chemical knowledge. He found that, when powdered *horn-silver* is spread over paper, and the colors of the solar spectrum are made to fall upon it, the powder in the violet ray turns black sooner than that exposed to the other colors. Senebier afterward showed that the silver chloride was darkened in the violet ray in

fifteen seconds to a shade which required the action of the red ray for twenty minutes. That is, the chemical intensity of the violet ray was eighty times greater than the red.

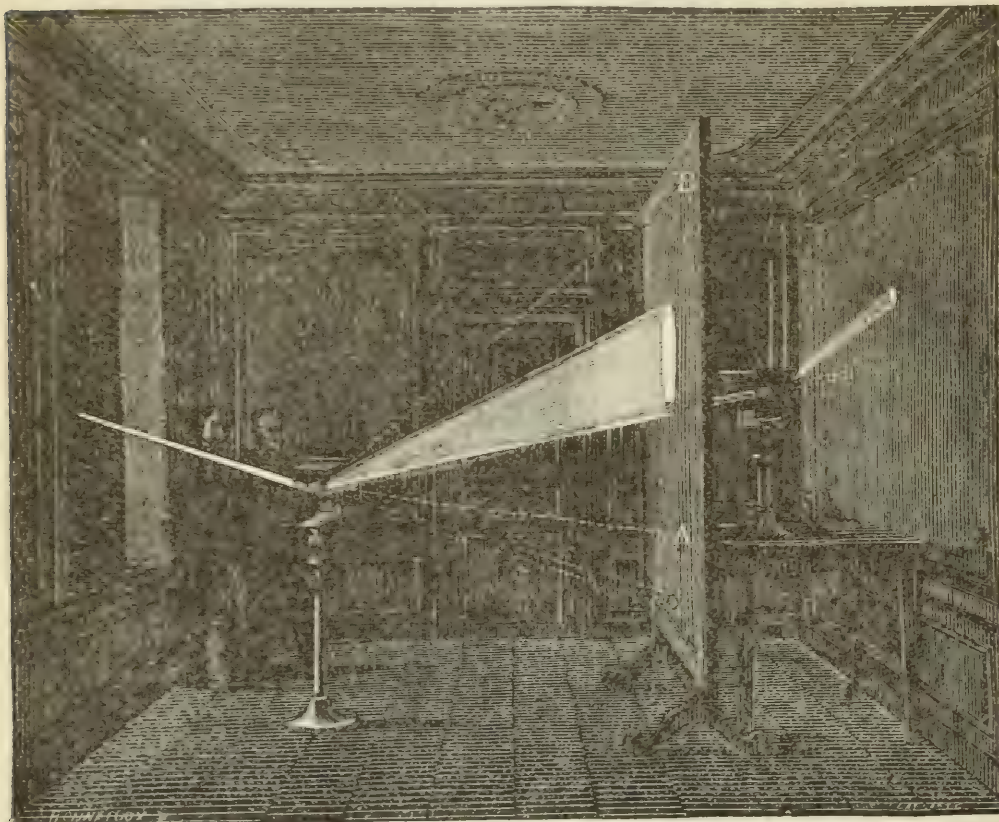


Fig. 1.—Positions of the Three Spectra.

The next step was one of great scientific importance, indicating, not only the differentiation of the different modes of action in the sunbeam, but the actual separation and isolation of the different agents. This took place just at the opening of the present century. It was shown by Sir William Herschel, in 1800, that, when the sunbeam is decomposed by a glass prism, as shown in Fig. 1, the heat is distributed unequally through the series of colors—is lowest in the violet, increases in the yellow, but is most intense in the red. This he determined by the use of delicate thermometers, and, in the same way, he proved that the thermal rays of the sunbeam are not all thrown into the visible spectrum, but are of such low refrangibility that they accumulate in the dark space below the red. There is therefore a spectrum of dark rays, producing heating effects, which, beginning at *A*, Fig. 1, in-

creases in strength till it approaches the red, and then fades away in the upper region of the spectrum.

These results of Herschel were followed by the discovery of Ritter, made the next year (1801), that the chemical rays, which had been shown to be the most active in the violet portion of the spectrum, were also thrown by refraction into the dark space beyond the violet. As a thermometer was the test in the case of heat, so an appropriate chemical substance has to be used to test the distribution of this force. If a solution of silver nitrate is washed over a large sheet of paper, which is then placed upon the wall or screen so as to receive the spectrum upon its surface, and is also made to cover the space considerably above it, a transformation occurs where the radiations fall, producing a blackening which defines the outline of the chemical spectrum. It is now found that the chemical rays are more refrangible than the luminous, and that, while the darkening takes place in the colored spectrum, it is strongest in the violet of all the colors, and extends also through the dark space up to *B*, as shown in the figure.

It is now exactly 200 years since Newton published his "Optics," in which was described the capital experiment of resolving white light into its constituent colors by the prism. It was the first great step toward showing that what was regarded as perfectly simple turns out to be inexhaustibly complex ; and every succeeding step of research, while clearing up some points, has led to others which are still unresolved. One thing, however, seems to be quite clear : the mode of action throughout the spectrum is fundamentally the same. There are three spectra, one of which, the thermal, takes action upon all kinds of matter ; another of which, the luminous, acts only upon a certain special form of nerve-matter ; while a third, the chemical, produces changes in certain compounds. Although the luminous force acts only upon the nerve of the eye to stir up a sensation, yet we know how infinitely complex and varied is the world of color that results. There is evidence that the dark thermal and chemical radiations are of equal variability and complexity, yet there can be no doubt that all these multitudinous effects are due to a single mode of action. The difference between the thermal and the chemical rays is simply the difference between the red and the green ; that is, a difference of wave-length and degree of vibration.

The unequal distribution of the forces of the spectrum is well illustrated by Fig. 2. The middle curve shows the varying intensity of the luminous force. The maximum is at *B*, in the yellow space ; and

from this point the intensity of the light rapidly declines each way, its extent being shown by the space shaded with oblique lines. The curve *A*, with the vertical lines, represents the position and varying force of the heat; and the curve *C*, horizontally shaded, exhibits the distribution and unequal energy of the chemical force. The three maxima are widely separated, as if there were some antagonism among them, and it is noticeable that where the light is strongest the chemical force quite disappears. Different prisms give somewhat different effects, but do not change their order.

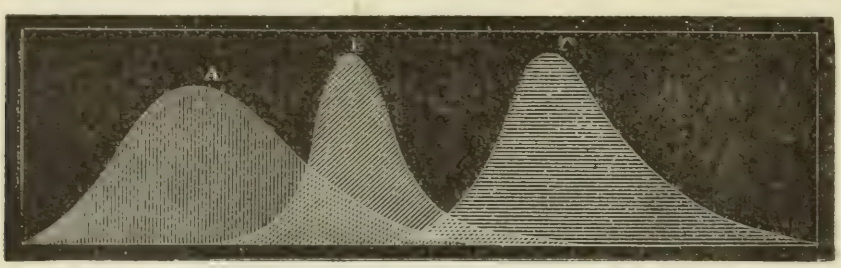
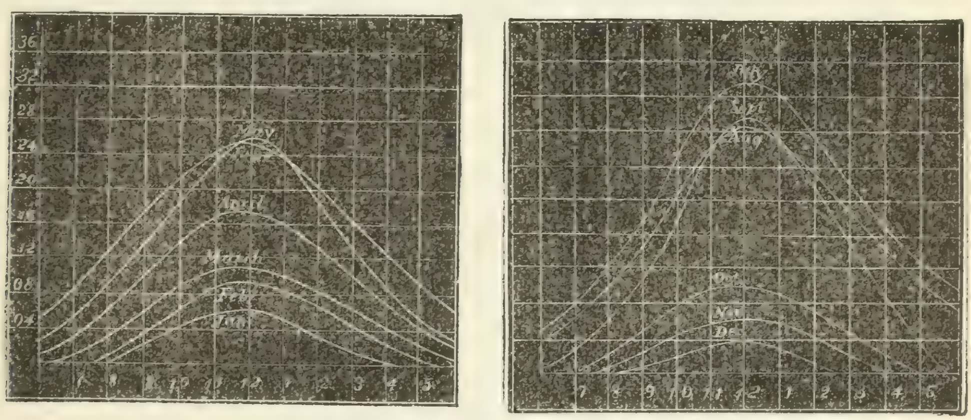


Fig. 2.—Intensities of the Forces of the Spectrum.

It thus appears that, so far from light being the agent which produces sun-pictures, the intensest light is powerless upon the chemically prepared plate. It looks as if the illumination neutralized or extinguished the chemical energy. Nevertheless, light and the chemical force are so intimately associated in reflection and refraction that the colors become the guides of the artist in conducting his processes. When a person sits before the operator's camera, ready to be "taken," the radiations which are reflected from his face into the instrument, and collected to a focus by the lens, form three pictures, one behind the other, the thermal, the luminous, and the chemical image. The luminous image is visible upon the ground glass plate, giving all the colors of the object, but the chemical image is now blurred, and the focus has to be readjusted so that the chemical picture will be clearly and sharply defined; but, as this image is invisible to the operator, he has to make his readjustments by rule. As he cannot reproduce the colors in the photograph, he has to substitute for them tints and shades; but the chemical force is so unequal in the different colors that the natural effects of gradation in tone and shade are not brought out in the picture. This is one of the embarrassments of the process. From the representation in Fig. 2, we should infer that blue colors would act energetically upon the photographic plate, and the yellow

and red feebly, or not at all, because the chemical rays abound in the former and are absent in the latter. Of this false working of lights Prof. Vogel says: "Blue generally works clear, yellow and red work like black. The yellow freckles appear, therefore, in a picture as black spots, and a blue coat becomes perfectly white. Dark blue flowers on a light yellow ground produce in photography light flowers on a dark ground. Red and also fair golden hair become black. Even a very slight yellow shade has an unfavorable effect. A photograph from a drawing is often blemished by little iron-mould specks in the paper, invisible to the eye. These specks frequently appear as black points. There are faces with little yellow specks that do not strike the eye, but which come out very dark in photography. A few years ago a lady was photographed in Berlin whose face had never presented specks in photography. To the surprise of the photographer, on taking her portrait, specks appeared that were invisible in the original. A day later the lady sickened of the small-pox, and the specks, at first invisible to the eye, became then quite apparent. Photography in this case had detected, before the human eye, the pock-marks, very feebly tinged yellow."



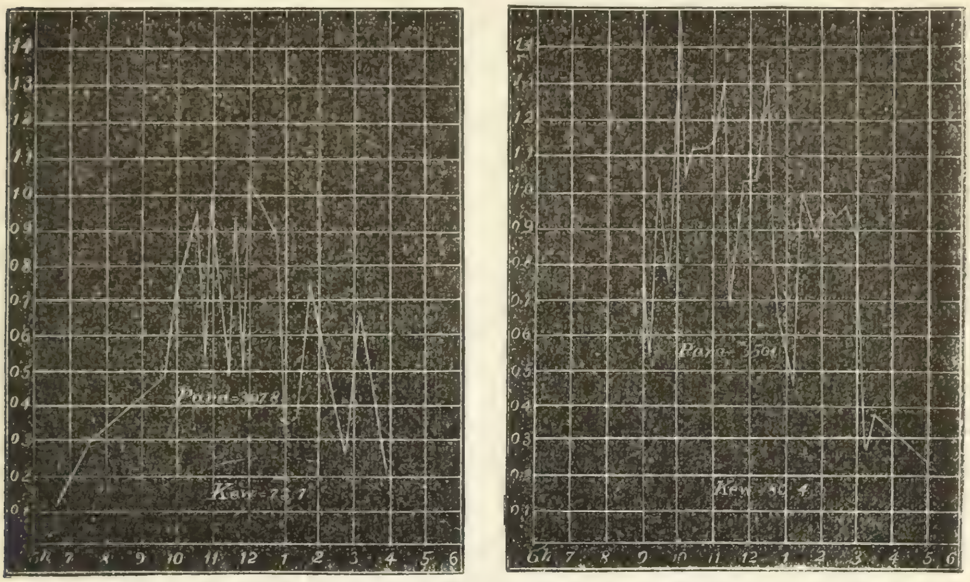
FIGS. 3 AND 4.—VARIATION OF CHEMICAL RAYS AT KEW.

The chemistry of light first became, in the full sense, a branch of science capable of thorough investigation when Dr. Draper devised a method of measuring the force of the chemical rays, and thus brought the subject within the sphere of quantitative research. He showed that these rays are absorbed in the chemical combination, and that the rate of absorption corresponds to the amount of chemical change. He applied mixtures of chlorine and hydrogen gases for this purpose, which combine under the action of the chemical radiations, the measurable rate of combination becoming the index of radiant activity.

Professors Roscoe and Bunsen subsequently employed sensitive papers, which were blackened in certain times to certain shades, as measurers of the chemical force, and these were used at the Kew Observatory near London, to trace the variations of chemical activity in the solar rays. For, as the chemical force is not light, neither does it follow the laws of light in producing its effects. Dr. Draper had previously shown that, as we go southward toward the equator, and the light increases in brilliancy, there is an increasing interference with the chemical rays, the yellow space of no-chemical action widening with tha progress southward. It is also well known that there is much greater difficulty in obtaining good photographic pictures under the full blaze of a tropical sun than in our own latitude. The investigations at Kew were accordingly directed to the variations that the chemical rays undergo at different hours of the day, and at different seasons of the year. The graphic diagrams, Figs. 3 and 4, show the results that were arrived at in 1866. The curves exhibit the rise and fall of the average monthly chemical intensity with the hour of the day, from 6 A. M. to 6 P. M., throughout the year. We see from these curves that the maximum of chemical action occurs at twelve o'clock, and that the forenoon rise and afternoon decline are very nearly equal, while the chemical intensity of July is fully seven times as great as in December.

The statements that have been made that in Mexico, where the light is very intense, from twenty minutes to half an hour is required to produce photographic effects which in New York require only a minute ; and the further statement of travelers, engaged in copying the antiquities of Yucatan, that they frequently have been obliged to abandon the use of the camera, and take to their sketch-books, have led to some investigations, similar to those at Kew, for determining the intensity of the chemically-active rays in the tropics. Prof. Thorpe experimented at Pará, situated nearly under the equator, in the northern province of the Brazils, and lying on a branch of the Amazon. Of the results, Prof. Roscoe remarks : "Owing to the rainy season having commenced when the experiments were made, the changes in the chemical intensity, as observed from hour to hour, and even from minute to minute, are very sudden and remarkable ; this is well shown by the zigzag lines of Figs. 5 and 6 ; and these, compared with the dotted lines below, indicating the corresponding action on the same day at Kew, show the enormous variation in chemical intensity which occurs under a tropical sun in the rainy season. Regularly every

afternoon, and frequently at other hours of the day, enormous thunder-clouds obscure the sky, and, discharging their contents in the form of deluging rain, reduce the chemical action nearly to zero. The storm quickly passes over, and the chemical intensity rapidly rises to its normal value. By comparing the curves for Pará and Kew on the



FIGS. 5 AND 6.—VARIATION OF CHEMICAL RAYS IN THE TROPICS.

same days, we obtain some idea of the energy of chemical action at the tropics, and it is at once evident that the alleged failure of the photographer cannot at any rate be ascribed to a diminution in the sun's chemical intensity, which, in the month of April, 1866, was nearly seven times as great at Pará as at Kew."

THAT "VAGRANT."

MR. EDITOR: JOHNSTONS' DENTAL MISCELLANY for March has just reached me, and "Our London Letter" read. If you permit a "Vagrant" to write to you, and acknowledge his correspondence as "Our Letter," &c., perhaps, dear sir, you would consider it a kindness if your Vagrant should be corrected when he wanders away into unknown places, and gives statements about the same that are not according to the standard of truth. In his letter of January 15th, your London correspondent indulges in a few flings at the "American Dental Society of Europe," against its name, against its object, and against "at *least*

one of its members." He says: "It is easier to give a name than make a reality," and talks about the arrogance of the Society, and suggests modesty as a virtue, and an "immediate attention" to the dental journals of the United States, and the condition of the home Societies, &c., &c. What is there in the name "American Dental Society of Europe" to excite the wrath of any intelligent dentist, whether he be English, Irish, German, or French, provided the Society is an American Society, and a Dental Society, and meets in Europe? At first, as the Society was begotten in Switzerland, it was thought that the "American Dental Society of Switzerland" would be a good name, but as members of the profession from Italy, France, Germany and Belgium offered their encouragement, and proposed to adopt the infant, it was christened as above, which gives offense to Vagrant. Why, no sensible man can understand, unless Vagrant has not been invited to attend the meetings, and feels it a personal wrong that a Dental Society should claim to be European without his presence. Then the object of the Society is said by your correspondent to be the "sublime task of establishing the dental profession in Europe on the same grade, etc., etc." Nonsense! The very fact that the Paris butcher who displays specimens of dental skill (can it be Vagrant's skill) in his shop window, and the fact that Vagrants *are* excluded from the Society, contradicts your correspondent's statements, and should satisfy him that our Society, as has been clearly explained in an American Journal (which, by the way, is one of those Vagrant may have intended when he urges us to read American Journals) is "*not a missionary Society.*" We have never claimed as an object, "to elevate the dentists of Europe," nor Paris butchers, and we appreciate the fact that were we ever so "immodest" and "arrogant," we would have "up-hill work" indeed, if our object extended in the direction of trying to elevate to a better appreciation of Society work, Society advantages, Society intellectual stimulus, the acknowledged Vagrants of the profession. No, indeed; "strangers are hardly the men" to attempt to "lead" such fellows as this *modest* and sensitive Vagrant. We will not interfere at all in his boasted fights that we know nothing of. We have no interest whatever in his elevation. All we can say is what all society says to the Vagrant, "*Move on.* Come, move on now;" for we are suspicious when you hang about our property. And then this sentimental wanderer hides himself under a *nom de plume*, and calls us "ten or twelve *expatriated* practitioners," and accuses us of "setting ourselves up to act as luminaries" for his lunar understanding, or words to that effect.

It is unnecessary for me to point out the evidences in his letter of his bitterness, and jealousy, and wounded self-esteem—though, as he writes over an assumed name, we cannot know who has favored the readers of the MISCELLANY with this attack. If your correspondent is known to you as a dentist of respectability, he should not have struck at our young Society without better information about the character, the object, and the members of the American Dental Society of Europe ; and if he is, as he claims, battling for anything good in the profession of Dentistry, he should try to keep on the right side, and not throw stones both ways. When he battles against us, he fights a very young, but a very determined little Society, who has as yet not had much time to make grave errors, and whose record is too short to excite disapprobation, but who will grow old and *respected.* There has always been a large class of surly and jealous practitioners, who have been opposed to Societies and Society men ; who grumble about and try to ridicule this or that member of a Society, and condemn the Society on his account, and will not themselves become members, preferring rather to remain out of the ranks, that they may jeer and hoot at the mistakes or failures of those who make efforts within. This class is well known in America, and we begin to see some evidences of it abroad. Having been connected with several good Societies at home, I feel competent to judge, by comparison, of the merits or demerits of the American Dental Society of Europe, and though your correspondent is pleased to publish to the world that we are "expatriated practitioners," we have founded a Dental Society on the basis of our home Societies, appreciating our loss of the advantages of our old Societies and the many advantages to ourselves of a Society.

Our objects are as plain and as pure as those of any Society at home. We have no oppositions, no jealousies, no wars, no quarrels, and do not intend to have any. We have started with flattering prospects ; for Rome, Berlin, Lyons, Paris, London, Dresden and several cities in Switzerland have been, and will be, represented. Our Society has Prussian and Swiss citizens as members among its numbers. Our two meetings have been characterized, as other American Societies are, by practical and scientific discussions and essays, the exhibition of new and interesting appliances, and the illustration of particular or individual methods. In other words, we have met and exchanged ideas, and become acquainted with each other, and have returned to our routine of work with increased interest in our calling, with broader and less selfish ideas. Though we are "expatriated practitioners," we have

been taken by the hand cordially by eminent native practitioners, and have borne the howl of jealous rage and the sneers of petty Vagrants with becoming quiet and dignity. It is only when our American journals permit correspondents of the Vagrant order to attack us, that one of these "expatriated practitioners" lifts his pen in defense of our Society and in defiance of the Vagrant party.—"*Move on!*"

I take pleasure in signing my own name.

C. M. Wright,

March 31st, 1875. *Basel, Switzerland.*

ON THE PRECAUTIONS NECESSARY TO BE OBSERVED IN THE USE OF AMALGAM.

By Thomas Burgh, D.D.S.

[*Continued.*]

A very important thing in the insertion of Amalgam, which I have learned, is that the filling should be uniform in the amount of mercury it contains, in all its parts. It has been my habit for years to occasionally insert the first portion of Amalgam fillings wetter with mercury than the last. This I would do, because the filling could be more readily started with the wetter portion, unto which the dry could be more easily added. Sometimes, in inserting a filling, I would find, as I approached the surface, that I had more mercury in it than was necessary; and I would subject the remainder to very vigorous pressure. I always had a slight suspicion of the danger of this practice, viz., that the first portion of the filling, in parting with the mercury which the last portion absorbed, would shrink in the process. To offset this suspicion, however, I surmised, or hoped, that the wetter portion of the filling would, in the process, draw toward itself the dry portion, and thus re-establish or maintain the adjustment. The suspicion at the worst was a mere speculation, and I was unwilling to abandon the manifest and practical advantage of getting rid of so much more mercury at the bidding of an untested objection. The first intimation which I received that my suspicion was well founded, was an intimation of the danger from Mr. Fletcher; yet as his intimation was but a vague allusion, unsubstantiated by anything definite, (I quote from memory) and as I had never experienced any trouble which I could refer to the practice, it only operated to strengthen my suspicion, and not to cause me to abandon the practice. I soon had

practical and unquestionable evidence, however, that Mr. Fletcher was right. A few months since, I inserted a large Townsend Amalgam filling, washed and squeezed in the usual way, but with the last portion mercurially dryer than the first. On finishing that filling the next day, I discovered that it was loose in the cavity, precisely like a cohesive gold filling of which the foundation had not been well secured. Not perceiving, at first, the cause, I was mortified and discouraged. Here I had been using Amalgam for something like twenty years, during which time it had refuted, in my experience, all the fanciful charges and speculative objections which had been brought against it, and now, at this late date, it realized one of those objections in the most unequivocal manner. I regarded Amalgam as one of the most capricious of substances, and dentistry as the most unsatisfactory of callings. I felt humiliated as I told the patient that I should have to remove that filling; and I made an appointment for the next day for that purpose. In the meantime the manner of inserting the filling occurred to me, and the explanation flashed on my mind. To test the matter, I resolved to put the filling in under precisely the same circumstances, out of the same lot of Amalgam, with the exception that it should be uniformly mercurialized. I removed the filling with a good deal of trouble, for it was well anchored, and inserted another one, observing the precaution indicated, washing the Amalgam, and expressing the surplus mercury with the pliers. The result was satisfactory, for, on finishing the filling next day, it was found to be as tight as usual. I have reason to suspect, however, that the lot of Amalgam out of which it was used, was not as good as usual. But if so, it only needed a poor article to demonstrate the danger; for if a poor Amalgam will work in that manner, the best, at least of the same kind, will be only less objectionable; and if we are to know only by using, whether we have the poorest or the best, the precautions which are to be used against the worst should always be taken.

This discovery at once opened my eyes to the dangers of a practice in which I had occasionally persisted for years; and afforded a probable explanation of many failures in Amalgam fillings, the cause of which appeared to me, like that of toothache to an ancient writer, known only to God. It also exemplified the danger of putting into practice theories which have not been tested by experiment, however specious they may appear; and revealed the slight bound which separates success from failure, when vigilance sleeps and true judgment is not exercised. How varied are the acquirements which can be utilized in the calling

of the dentist! How should we hesitate to suffer even the slightest innovation to peril the success of our operations, when it may involve some occult law of chemistry, or other science, requiring industrious investigation to search out!

Let it then be distinctly understood, *that Amalgam should be inserted with a uniform degree of mercurial saturation.* And, too, as the operator is not to violate this law designedly, he should be on his guard lest he should do so unintentionally. A practical violation of it in the extreme, would be to insert an Amalgam filling over a fang filling of tin, with no non-conductor intervening. To this practice too I must plead guilty, and to a fellow practitioner am I indebted for a knowledge of the danger. During a conversation with Dr. O. A. Jarvis, of this city, I mentioned that I was in the habit of filling fangs under Amalgam fillings with tin, when he said that the tin would absorb the mercury from the filling, and carry it into the roots. I answered that I always soaked my tin in creosote, and that, I thought, being of an oily nature, would prevent the passage of the mercury. He replied that that made no difference, the mercury would pass all the same. If this was so I thought it was time to know it, and I resolved to verify it immediately. Accordingly, I prepared a number of teeth in the hand, filled the fangs with tin saturated with creosote and tannin, precisely as I would in the mouth, and filled the crowns with Amalgam in the usual way. On examining the cases in the proper time, I found the tin in the fangs amalgamated from crown to apex, in every case. I found the amalgamated tin, however, to be harder than mere tin and mercury would be, which indicated that other metals, besides the mercury, had been attracted out of the Amalgam, or that but little mercury had been absorbed. There was not the slighest approach to anything like free mercury; and so little did I fear any pathological action on the periosteum, and so little was I at first aware of the real danger to the plug, that I thought it might be a good way to withdraw still more of the mercury out of it than I had been able to express. Accordingly I continued for some time in the practice designedly. But some fang fillings and pulp chambers taking so much tin, I began to fear the effects on the plug, and gradually abandoned the practice; and I have now, for years, always interposed a layer of gutta percha between an Amalgam filling and a root tin filling.

The filling inserted, with all these slight, though important precautions carefully noted, the trite observations about smoothing and burnishing need hardly to be repeated. I will, however, insist upon their

importance ; adding that the burnisher should not be used roughly on the edges. Amalgam is brittle, and hard burnishing on the edges may only have the effect of breaking them up and roughening them. I think a better time to burnish an Amalgam filling, of which tin is a large ingredient, would be in a week or so after it is inserted. It will be found to be harder after that time than earlier.

In conclusion I would urge the importance of noting along with the record of the filling which every dentist should keep, any incident attending its introduction which may serve to throw light on its future history. This is useful in using any material, but particularly so with Amalgam, which is subject to so many contingencies after it leaves the hands of the operator, to which other fillings are not. The kind of Amalgam should be noted—if it was washed or unwashed—the degree of mercurial saturation—if anything was defective about the cavity, such as imperfect preparation arising from an uncontrollable patient—if the walls were frail and liable to give way, and in that event occurring, leaving the operator in ignorance, but for the note, whether they gave way from frailty or through some failure of the filling—in short, anything, however apparently insignificant, which may throw light on the future condition of the filling, should be noted. To neglect this is to work blindly. When this is done all has been done that foresight and precaution can accomplish to guard against failure in the future ; and if such failure should occur, the dentist can say in effect to his patient, "This filling has failed through no neglect of mine, but either through yours, or through circumstances which could not be controlled." I have myself realized the necessity of keeping such a record but a short time. Until a few years ago I not only made no memoranda of the peculiarities of the case, but I did not even note the kind of Amalgam used. Accordingly, when a filling fails that was inserted before that time, I have nothing but conjecture to aid me in determining the cause of the failure. I have never used any other Amalgam than Townsend's and Lawrence's ; and yet I cannot tell through my record which is the best. Of course I could tell from memory if the filling failed in a few months, but I do not have many such failures as that, and after the lapse of years the recollection fails.

The manufacture of Amalgam is a matter of great importance to the dentist, and this is one of the things which he cannot afford to purchase except from reliable parties. The next thing to manufacturing his own Amalgam is to know the reliability of the parties furnishing it, and also to know its composition. Most other things which he purchases

are of a simple nature, and are subject to no change after they leave his hands; but Amalgam is a compound, the conduct of which will be more or less reliable, according to the care with which it is manufactured. The habit of Mr. Fletcher, of subjecting every ingot to a separate test, and of rejecting all that do not conform to a certain standard, is commendable, and is one which should be followed by every manufacturer, the additional expense of which every dentist could well afford to pay for. What excuse is there for sending out a defective lot which may make hundreds and thousands of defective fillings, when a little re-melting would correct all defect?

The subject of Amalgam is one of constantly increasing importance and interest. It is a material which, in the past, I have not hesitated to defend. The unsubstantial nature of the objections brought against it was manifest to my mind; and the habit of holding it responsible for the abuses of charlatans was one to which I could give the indifferent attention which it merited. I do not now hesitate to say that a career of increasing usefulness opens before it, and that it seems susceptible of greater improvement than any other material used for filling teeth. How different is its status now from that which it occupied when, in 1830, Snell, honest soul, deplored the spectacle of his patients leaving him to place themselves under the care of the puffing pretenders of the day, who practiced on the credulity of mankind by the employment of a mercurial compound "almost too worthless to be mentioned." (Snell on the Teeth, page 158.) How different is the estimation in which it is held now, compared with that in which it stood but a short decade ago, when the editor of the *Dental Cosmos*, in commenting on the paper which I then published, said that a young man, in beginning his professional career, could not afford to defend Amalgam. Let the dentist who uses it discharge his duty in this, as in other things, with judgment, earnestness, and fidelity, and he will find that Amalgam is not destitute of merit, in its proper place.

Before dismissing this subject, I would call the reader's attention to the paper on Amalgam, read by Dr. Bogue before the special meeting of the New York Odontological Society, held last December. That paper was full of valuable information upon the subject, and with other papers with which the Society did credit to itself on that occasion, and honored the profession, went to place dentistry far on the high road of the inductive sciences.

[In the first part of this article, in the April number, page 150, fourteenth line from the top, for *unwashed* read *washed*.]

THE ASCLEPIAS BASE.

By W. C. Barrett, M.D.S., Warsaw, N. Y.

This new aspirant to recognition at the hands of the dental profession, was briefly alluded to in the last number of the Miscellany, and the report of a committee, appointed by the profession of Western New York, to test it, was also published. That committee was appointed long before any of the new base was ready for their experiments, and they have watched the progress of the gum toward an established practicality with considerable interest. It is as yet in a crude state, and far from realizing what it is believed it is capable of being, but as its success, even in its present imperfect condition, seemed demonstrated, it was thought best to give the profession an opportunity to submit it to their own tests. It is believed that it will prove a substitute for rubber, not only in Mechanical Dentistry, but in all the various arts, and that it is equally adapted to all the thousand purposes for which rubber has been heretofore used.

The discoverer of the method of extracting and utilizing this gum is Mr. D. M. Lamb, of London, Ont., and the various patents are now held by a company organized in that place, and of which Mr. Marvin Knowlton is President.

Almost any one who has ever lived in the country, is aware that from the wounded stalk or leaf of the common milkweed (Asclepias Syriaca) indigenous to nearly every State in the Union, a peculiarly resinous viscous fluid exudes, which inspissates upon exposure to the air. Many persons have entertained the opinion that this juice might in some way be utilized, but none succeeded in reducing theory to fact, till Mr. Lamb concluded his three years of study and experiment by producing some hundreds of pounds of vulcanizable gum from a ton of the green weed. After many failures, he, partially by a fortuitous circumstance and partially by inductive reasoning, discovered the present process, which is extremely simple.

During the months of June and July, when the weed is in blossom, it is gathered and cured in the air, till it may be stored away without danger of spontaneous fermentation. Whenever thereafter it is desired to extract the gum, the weed is first cut up into small pieces, and then macerated by steam and water. Expressing all superfluous moisture, it is now spread upon a floor in a room heated to the temperature of about

There are several plants known as Milkweed, and the Editor of the Miscellany recently inadvertently referred to this as Euphorbia Corollata, instead of Asclepias Syriaca, which latter is doubtless the milkweed used for the extraction of this gum. [Ed.

90 degrees Fahrenheit, and within a few hours the first process of dis organization—fermentation—commmences. When this has reached the proper point, the gum is found upon the surface of the weed, which is now placed in a vat, and subjected to the action of bi-sulphide of carbon, which digests the gum. The solvent is then distilled off and recovered, leaving the crude gum. In this state it is of a deep green color, owing, doubtless, to the chlorophyl of the plant which it contains. It is viscous, and so exceedingly tenacious, that, upon lifting a particle from the mass, it is drawn out into most minute and tenuous threads. It is soluble in chloroform, distilled spirits of turpentine, bi-sulphide of carbon, the lighter bituminous oils, and by any of the solvents of the hydro-carbon gums. No process of bleaching or purifying has yet been tested, owing to its late discovery, and the lack of time necessary for such experiments, but it is believed that it may very readily be bleached and rid of any fibrous or foreign matter which it may contain. Upon admixture of this gum with the proper quantity of sulphur, it vulcanizes in the same manner, and at about the same temperature as caoutchouc gum. It may be colored as easily, and, I am informed, will take some of the mineral and organic dyes that are decomposed when submitted to the vulcanizing heat in rubber, so that the use of mercurial pigments may be avoided. It bears a very close resemblance to rubber, when prepared for use, and when vulcanized can scarcely be distinguished from it. It is manipulated in precisely the same manner, but with greater facility.

In its characteristics, it differs somewhat from rubber. It seems to be free from that peculiarly irritating, heating, inflammatory property, inherent in soft rubber peculiarly. No thorough analysis of the gum has yet been made, but the expressed juice, or milk of the plant, has been found to contain

Water	69·0
Wax-like fatty matter	3·5
Caoutchouc	5·0
Other Gum	0·5
Sugar	1·0
Acetic Acid and other Salts	1·0
	80

U. S. Dis.

It has a faint smell, sub-acrid taste, and acid reaction. The chief solid ingredient, List finds to be a peculiar crystalline substance of a resinous character, and which he proposes to call *Asclepione*, the chemical formula of which is C_{40}, H_{33}, O_6. This substance it is, which chiefly

distinguishes Asclepias from caoutchouc. When vulcanized, the gum seems more dense and hard than rubber, with a more even, flexible elasticity. Its strength or tenacity is believed to be greater, though no series of experiments to fully test that quality have yet been entered upon.

It packs much easier, the flask being very readily closed at 212°, so that danger of breakage is greatly diminished. There is no perceptible shrinking or warping of the plate, after or during the process of vulcanization. Those tests which have demonstrated a very considerable change in vulcanized rubber, have failed in any case to detect any warping or shrinking of this, even when subjected to the most violent thermal changes. There is less taste and odor in the mouth than when rubber is used, but in the use of the present unbleached gum, it is necessary to remove from the surfaces the partially calcined fibrous impurities. It is the lightest base yet offered. I found the specific gravity of the uncolored vulcanized Asclepias to be :

Asclepias.	Specific gravity	1·19
Am. Red Rubber	"	2·00
Bow Spring "	"	1·45
Celluloid	"	1·31

As a conductor of caloric it probably ranks with all the hydro-carbon gums, though from its greater density, it may perhaps have an advantage. It remains intact at a temperature which destroys rubber. It is as easily finished as rubber, and bears as fine a polish.

The patent under which this gum is prepared has been, by the best legal talent, pronounced incontestible. That it is not an infringement upon any patent heretofore granted, and which affects the interests of dentists, may be readily inferred from a knowledge of the fact that no patent can be made to cover any subsequent original discovery, and which is not the mere substitution of an already known material, for the express purpose of evading a patent. The question then arises, whether there be any danger of the establishment of a despotism more onerous and exacting than any under which we now labor. I am assured by the owners of the patent, that they are determined that the purchase of this gum shall carry with it the right to use it, and that no odious system of office licenses shall in any case be resorted to. It was only upon this distinct understanding that I consented to be the medium of its first introduction to the profession. My interest in the new gum is precisely that of every dentist who loves his profession. Owing to the peculiar embarrassments connected with its employment, I had entirely abandoned the use of rubber in Mechanical Dentistry ; but I

am well aware that some cheap base, easily and readily worked, is a necessity to a large number of mechanical dentists. It is needless to discuss the expediency of employing such bases, since it is only the few who can discard them entirely. It only remains for us to choose that which is open to the fewest objections. I am convinced that Asclepias has such advantage over rubber, independently of the peculiar acerbity of feeling on the part of the profession toward the owners of the rubber patents, as makes it quite worthy the earnest attention of every dentist, and I am sure that my opinion will be substantiated by all who have made experiments with the new base. If it does no more than to relieve us from the exactions of a despotism that has become intolerable, it will have accomplished much. The gum is not, as yet, in the market: but I am informed by the proprietors that a limited amount will soon be obtainable, due notice of which will be given through the MISCELLANY or otherwise.

THE WATCH PRESENTATION.

One or two parties have called our attention to the remarks of "Vagrant" in our March issue, in reference to a watch presentation.

As a watch was presented last summer at Saratoga, to Dr. J. G. Ambler, these correspondents infer that an imputation was intended, as to the genuineness of that presentation. We therefore take pleasure in saying that we have seen the subscription list, which bears the signatures of many of the best known and most respectable members of the profession, hence we know this matter to be as represented. We make this explicit statement because such misunderstanding of the article seemed to have occurred to one or two parties. For ourselves, we do not understand Vagrant's article to be capable of any such construction, and Dr. Ambler's well-known character is such as would render any denial unnecessary on this side the Atlantic. ED.

APRIL 17th, 1875.

EDITOR MISCELLANY: A cable dispatch just received announces the death of Mr. Edwin Sercombe, of London, England. Mr. Sercombe was last year President of the Odontological Society of Great Britain, and has been most courteous and hospitable to the American members of our profession who have traveled in Europe. His loss will be deeply felt among the members of his profession on this side of the Atlantic as well as on the other.

Yours truly, E. A. BOGUE.

RUBBER DAM.

The secretions of the mouth have always been regarded as the greatest enemy we have had to contend with in filling teeth. Various appliances have been contrived from time to time by different members of our profession to overcome the obstacles we have hitherto met with in keeping cavities dry during the operation of filling, but each appliance has been more or less imperfect until Dr. Barnum, of New York, invented the *Rubber Dam.* Too much has never been claimed for it. In it we have gained what we have so long desired—*absolute freedom from moisture* in filling teeth.

The dental profession owe Dr. Barnum a lasting debt of gratitude for this valuable gift, so generously bestowed upon all its members ; yet, *strange to say*, there are many dentists now in practice who do not use the *Dam*, or know anything of its merits, and for the benefit of such we will describe the rubber, and give our methods of using it. The *Dam* consists of a sheet of rubber, varying in thickness from that of an ordinary business card to three or four times that thickness. I prefer the thin rubber, especially where the teeth are crowded. A small square or oblong sheet will answer a better pupose for the front teeth, while a much larger piece is necessary for the back ones.

After preparing a piece of rubber of suitable dimensions, a hollow punch, with a sharp cutting edge (found at any of the dental depots), should be used in cutting holes, through which the teeth are to pass. It is better to have two punches—one that will cut out a piece of rubber about the size of a pin's head, the other a size or two larger ; the smaller holes to be used when filling the ten anterior teeth, the larger ones for the molars.

If the teeth to be filled are small, and stand closely together, the holes in the rubber should also be close together. If considerable space exists between the teeth, a corresponding space should exist between the holes in the rubber. However, if the teeth to be embraced are molars, the holes should be a little farther apart than with smaller teeth, because the larger the teeth the greater the tension ; and if there is not sufficient rubber between the holes to compensate for the extra stretching, the necks of the teeth on their proximal surfaces will not be closely embraced by the rubber, and consequently there will be leakage.

When cavities extend below the gums, the rubber is of especial value. Suppose the proximal surfaces of the first and second bicuspids have cavities of this kind, but the holes be cut far enough apart to cause a

fullness of the rubber between the teeth. This excess of rubber will form a little tuck or bag, which will enclose the prominent gum between the teeth, while the rubber will hug the necks of the teeth, thereby excluding all moisture, and avoiding the painful process of cutting the gum away, or forcing it back with a wedge.

Putting on the *Dam* and retaining it in place is not always an easy matter. If the teeth are crowded firmly together it may be necessary to spring them a little apart by wedging, then by taking a strong thread (prepared for that purpose, and found at the dental depots) press the rubber down between the teeth. This may be done with the fingers, or with a thread-carrier (or instrument) made for that purpose. It is not often necessary, however, to resort to the wedge, as the rubber can usually be forced down between the teeth by a strong thread or cord. In such cases, after the *Dam* is once in place it is usually retained without any further trouble. In other instances the rubber is easily passed over the teeth, but owing to the necks being large and the crowns oval, it is exceedingly difficult to keep it there. A strong thread or cord may be used successfully in pressing the rubber down on the necks of the teeth, and holding it there during the operation. But a better way is to use the *Rubber Dam Clamps.* These are passed over the teeth by a pair of forceps made for that purpose. The invention of these clamps by Dr. Palmer, of New York, greatly increased the usefulness of the *Dam*, so that we can scarcely conceive of a cavity too difficult to fill, and *keep dry*, during the most tedious operation. I have frequently had patients leave the chair, and walk the floor for a few minutes to rest themselves, while the relief to myself has been equally refreshing. After a short recess of this kind both are better prepared to resume the fatiguing operation. All those difficult cavities on the buccal and labial surfaces of the teeth can be kept thoroughly dry, and filled with ease since the introduction of the *Rubber Dam* and *Clamps.* It matters not if the cavities *do* extend under the gums, the clamp will be readily passed down till it comes in contact with the alveolar process. The rubber should then be passed over the clamp and the tooth at the same time, and when once in position you may bid defiance to the saliva, and with a steady hand, and clear head, proceed with the operation until it is finished

The *Rubber Dam* is valuable not only for excluding the saliva, but the moisture from the breath, also. The strength of contour fillings is greatly increased by the breath being entirely excluded from the gold while it is being consolidated.

The rubber can often be used to great advantage in cleansing cavities preparatory to filling. If the tooth that is being operated upon is kept thoroughly dry, the operator can determine more accurately the real condition of the cavity. The slightest decayed speck will not escape his notice.

In attaching artificial crowns to the roots of teeth, the clamp should first be applied to the root, and then the rubber passed over it. It matters not how the crown is to be attached, the *Dam* is indispensable.

The *Rubber Dam* has brought about a new era in dentistry. There are better fillings being made now than were ever made before. And as I have from time to time been engaged in filling difficult cavities, giving myself time for *thoroughness*, knowing that the saliva could come so far, and no farther, and with the proud feeling that I was master of the situation, I bless Dr. Barnum for his invention, and from the promptings of a grateful heart I wish him a long, happy, and prosperous life.

ELECTROPLATING.

At a session of the Physical Association held in Frankfort, on August 30, last, Dr. Otto Volger delivered an address on the history and progress of the art of depositing metals by galvanic action, of which the following is an abstract :

At an early date it was known that a current of galvanic electricity was able to decompose liquids, and that metals deposited from solutions of their salts by this means assume fantastic shapes, which appeared so similar, at the first glance, to vegetable growth, that they were called galvanic trees, or metallic vegetation, although really consisting of crystals, and formed according to the laws of crystallization. Professor Böttger took especial delight in producing this sort of vegetation with different metals.

The use of such metallic deposits for electroplating was discovered accidentally. In 1830, Mr. J. P. Wagner, of Frankfort, and Professor Jacobi, of St. Petersburg, were endeavoring to employ electro-magnetism as a motive power, instead of steam. Jacobi employed a Daniell's battery, which is distinguished for its constant and regular action. It consists of an outer cup of copper and an inner cell of unglazed porcelain which contains the zinc rod. The intermediate space is filled with a saturated solution of sulphate of copper. When the battery is

working, this solution of blue vitriol is slowly decomposed, depositing metallic copper, which finally becomes injurious, and must be removed. Once when Jacobi was busied with removing such a deposit from his copper cup, he noticed that there were several layers of copper, each having the form of the sides of the copper vessel, and hence, concluding that the sheet copper of which the vessel was made had split up into layers, he accused the man who made it of employing a poor quality of sheet copper. A closer investigation, however, showed him that these layers, or leaves, did not belong to the walls of the vessel, but to a new deposit of metal, which imitated, in a remarkably perfect manner, the shape of the surface of the walls. It occurred to Jacobi that this troublesome disadvantage could be turned to profit by using it for reproducing objects. In 1838 he communicated to the St. Petersburg Academy a description of his discovery of the use of galvanic electricity for reproducing objects in the arts.

Czar Nicholas requested a German chemist named Klein, who was then employed in the imperial printing office, to test the practicability of the discovery, and to ascertain to what extent it was capable of development. The answer being a favorable one, he gave the discoverer the means of making his new art the common property of the whole world.

Electrotyping or plating with copper consists in merely making the object to be copied the negative element of a simple Daniell's battery. If the object is a conductor, metal for instance, and is to be only partially covered, the parts that are to remain uncovered are rendered non-conductors by coating with some non-conductor, as wax, stearin, or varnish. If it is a non-conductor, its surface is rendered conducting by brushing it over with a thin film of the finest graphite or silver powder. Murray discovered that graphite works the best. The reaction consists in the separation of the sulphate of copper into sulphuric acid and oxide of copper, while the water is simultaneously separated into oxygen and hydrogen. The sulphuric acid liberated at the anode or positive pole unites with the oxide of zinc, formed there by the oxygen given off from the decomposed water, to form sulphate of zinc, which goes into solution.

The hydrogen evolved at the opposite pole abstracts the oxygen from the oxide of copper, and forms water, while the copper is left in a metallic state. Hence it is really the hydrogen which causes the reduction of the oxide of copper to metallic copper, at the negative pole or cathode.

Up to the year 1840, this new art was only employed for making

small copies, like coins and medals, and these often came out of the mold imperfect, or were broken in detaching the mold. At that time, however, Professor Böttger prepared handsome relief plates of copper, and also employed galvanism for depositing a metallic coating on other metals, as for instance gilding silver, copper, and brass. In the same year, a copper plate engraver, named Kress, came to St. Petersburg, learned from Klein the galvanoplastic art, as Jacobi had named it, and became acquainted with the latter. Jacobi called his attention to the fact, that he could in this way make perfect copies of his etched or engraved plates, thus multiplying the original plate so as to obtain a great number of the most excellent impressions; for it is well known that a plate soon loses its sharpness, and every impression is poorer than the preceding one. At this suggestion Kress took up the art, and by 1844 had brought it to great perfection in his business. In 1841 Professor Böttger had made a copy from one of Professor Felsing's copper plates, in Darmstadt (the *Ecce Homo*, after Guido Reni, 12½ inches by 9½ inches), which was so perfect that Felsing declared that proofs printed with it were identical with those from the original plate, and of equal value. These plates are still in existence, the one in Berlin Museum, the other at Frankfort on the Main.

The galvanoplastic art has extended itself in three directions: 1. For covering other metals, as in electroplating with gold, silver, copper, steel, and nickel. 2. In producing objects formerly cast in metal. This has been brought to great perfection in several German cities, especially Mayence, where the smallest natural objects are copied and the largest works of art produced. Among the latter are three colossal figures on a monument in Frankfort. 3. The reproduction of engraved and stereotyped plates, and the like. In the latter, farther progress is still possible.

Early in 1840, Péligot reduced protochloride of iron by passing hydrogen gas over it, and in this way obtained metallic iron in octohedral crystals and in malleable plates. In 1846, Professor Böttger made the first attempt to decompose the chloride of iron by the electric current, and with success, but soon found that a mixture of the double sulphate of iron and ammonium and the double chloride of iron and ammonium was better for electroplating. This he prepared by dissolving simultaneously 2 parts by weight of protosulphate of iron and 1 part of sal ammoniac in water. As anodes he employed a piece of sheet iron; the cathode at once acquired a polished appearance from the metallic iron deposited on it. In this way he copied a florin in iron (several such

specimens were exhibited by the lecturer.) The iron is very hard, like steel, but unfortunately very brittle, so that it frequently breaks in taking it from the mold. No technical use could at first be found for it. In 1859 Jacquin found an application of it in covering copper plates with steel. This consisted in precipitating on the copper an extremely thin film of iron, which did not destroy the sharpness of the impression, but by its hardness offered such a protection to the copper that the latter was almost as durable as a steel plate. In this process, also, Professor Böttger's recipe proved the best, and was generally followed.

Recently, a chemist in St. Petersburg, also named Klein, has brought electroplating with iron to a remarkable degree of perfection. In 1868 he exhibited, before the St. Petersburg Academy, excellent results which he had obtained by using a solution of bisulphate of the protoxide of iron and a Meidinger battery, with a piece of sheet iron as anode. Klein deposited the iron in large plates, both thick and thin, as copies from engraved copper plates, and thus combined a soft, easily-wrought plate for the engraver, and an iron plate, as hard as steel, for the printer. The iron thus deposited was, to be sure, very brittle, which Klein found to be due to the hydrogen occluded in it, its specific gravity being 7.675, or a little higher than rolled iron. By heating the iron, he succeeded in expelling the hydrogen, when it became more dense, and had a specific gravity of 7.811, which is higher than wrought iron. It was perfectly malleable, highly elastic, and could be welded like sheet steel; in short, was an excellent malleable iron. Klein has prepared plates of this iron weighing 16 lbs.

Electroplating in iron will find an important and extensive use in manufacture of stereotype plates, especially for printing government paper and postage stamps, where colored inks are employed, for the iron would not be attacked by the colors containing mercury, which acts on copper and other metals.

In conclusion, the lecturer referred to the occurrence of native metals in the earth, and the theory, advanced almost thirty years ago, comparing the earth to a voltaic battery. Hardinger believed that he could prove that the surface of the earth was the anode, and the interior of the earth the cathode of a galvanic battery. According to this, native metals should only be sought deep down in the earth, which is not always the case. It is much more probable that native metals have been reduced by the decomposition of organic matter. This applies especially to copper, and also to the very rare telluric iron. The graphite found in the latter is to be considered as the residuum of decomposed

organic compounds. In the Rotanger sea in Sweden, native iron is found replacing particles of wood, as if petrified, and the microscope is able to detect the cells and determine that it was a species of pine wood. The interior of the cells is also filled with a deposit of iron. This is not to be attributed to the action of a galvanic current, but to the reducing power of the hydrogen liberated from the decomposition of organic matter.—*Scientific American.*

OPIUM FROM NORTH CAROLINA.*

Many experiments have been tried with varied success in the way of cultivation of poppy in different parts of our country, and this department has lately received a communication from Mr. F. J. Kron, on this subject, accompanied with a specimen of opium produced near Albemarle, Stanley County, North Carolina, which presented a very fair appearance. The following is Mr. Kron's communication :

"Some four years ago, seed of the opium-poppy, originally derived from Turkey, was obtained from the Department of Agriculture, and has been experimented with here ever since. The results have demonstrated that both our climate and our soil are well adapted to the production of either poppy-seed for the manufacture of poppy oil (*huila d'oilette* of the French), or of opium as good as can be made anywhere. The results have ever shown that the plant here is decidedly hardy, contrary to what is stated concerning it in the report of our consular agent at Smyrna, in 1869, where it is represented as being tender to frost. Here, where the temperature some years falls below zero, the seed sown, as in Asia Minor, in the fall, vegetates freely and passes the winter safely, to present, in the spring, plants of remarkable vigor, provided with heads which are numerous and large, far superior to the plants raised from seed sown in the spring. The yield, however, has not thus far been abundant enough to make the culture remunerative. An idea may be formed in that respect from the fact that only 216 grains of opium were obtained from 220 heads. But the quality of the opium produced is something superior to anything we can obtain in commerce. It is all opium ; none of the filth and seed which often constitute three-fifths of the bulk of the opium sent to us here. In medicinal properties it will not disappoint the practitioner, but present him with all that is expected from the greatest of boons of Providence to suffering humanity."

*Report of the U. S. Department of Agriculture for October, 1873.

The sample of opium sent was free from foreign matters; was well dried, and was quite hard and resinous. When pulverized and subjected to analysis, the air-dried product yielded 5.01 per cent. of pure morphine. This proportion of morphine is rather low; yet it is nearly equal to that of many varieties of opium from India. In order that this result may be compared with results of analyses of opium from other localities, we give below a table of results obtained by different analyses:

Locality.	Percentage of morphine.	Analyst.
Smyrna	12 to 14	Guibourt.
Egyptian (dry)	5.8 to 6.6	"
" (undried)	6 to 7	Merck.
East Indian	5.3 to 7.7	Guibourt.
Persian	11.37	"
Algerian (white poppies)	1.52 to 8.57	Aubergier.
" (red poppies)	10.37 to 11.23	"
" (purple poppies)	14.71 to 17.83	"
Erfurt (blue poppies)	16.6 to 20	Blitz.
" (white poppies)	6.85	"
French (dried) maximum	22.9	Guibourt.
" " minimum	14.8	"
Cermont (Addison County)	15.75	
California (Marin County)	5.75	

In the determination of morphine in the North Carolina specimen, the method of Proctor gave the most satisfactory results; twenty grammes of the dry pulverized opium were rubbed with repeated portions of water until finely divided, and allowed to digest twelve hours in about six times their weight of water, when the whole was removed to a filter and washed with water until the washings were completely colorless and tasteless, the fluids thoroughly mixed and divided into portions representing ten grammes each for duplicate determination.

The solution thus obtained is treated with solution of subacetate of lead as long as precipitate forms, the precipitate being separated by filtration and well washed. To the filtrate add dilute sulphuric acid, drop by drop, to separate the excess of lead as sulphate, filter and evaporate the fluid to small bulk at a low temperature, mix with an equal volume of alcohol, filter, and treat the filtrate with fifteen to twenty grammes of ammonia sp. gr. 960, mixed with an equal volume of alcohol. The alcoholic solution of ammonia is divided into two portions, which are added half an hour apart, after which the fluid is allowed to stand twenty-four hours. The morphine, which separates in distinct crystals, is collected on a weighted filter, washed with diluted

alcohol, and freed from a small quantity of narcotine which may be present by washing with ether. The remaining crystals of morphine are carefully dried and weighed.

DOMESTIC SALTPETRE.

In an article on the "Stassfurt Potash Salts," written in 1871, Professor Goessman thus mentions a manufacture which has become one of importance in this country, although not very generally known. "The production of the latter (nitre) from Chili saltpetre, by means of Stassfurt chloride of potassium, was added some four or five years ago to the chemical industry of the New England States ; one party in Boston purchased lately not less than one thousand tons of chloride of potassium from Stassfurt."

In October, 1861, during the early days of the late war in this country, a process for making nitrate of potash and caustic soda from commercial "potash" and nitrate of soda, devised and demonstrated by Dr. A. A. Hayes, some ten or fifteen years before, was put into practical operation at the works of the New Haven Chemical Company, in Connecticut, under his direction, and proved remarkably successful, a considerable part of the nitre used by the United States Government having been produced in this way. By this process crude Canadian potash was first brought into solution in water and rendered thoroughly *caustic* with lime ; after depositing and concentration, this solution was mixed with one of Chilian saltpetre, in equivalent proportions, at the proper densities and temperature. The chemical reaction takes place at once, nitrate of potash of great purity separates completely from the solution by crystallization, and the mother-liquors, boiled down, yield caustic soda such as is not now procurable in commerce. We very seldom witness such an exact and complete interchange of bases in any chemical process, practiced on the large scale, as takes place in this manufacture ; two nearly crude materials are brought together, and the products, both of unexceptionable purity, are obtained immediately, without the formation of any secondary product or "odd ends" of any kind.

Many hundred tons of nitre were made in this way at the works in New Haven during the following three years, the production often exceeding five tons or ten thousand pounds of refined saltpetre per diem. In 1864, the demand for potash created by this manufacture caused a

scarcity, and the price of Canadian potash was advanced proportionately. To meet this deficiency, endeavors to procure potash economically from feldspar, green sand, beet-root ashes, and from other sources, were being made, when the Stassfurt Carnallite, and eighty per cent. chloride of potassium, first appeared here as articles of commerce, and they were brought into use in this manufactory at once.

Dr. Grüneberg had begun the making of saltpetre from chloride of potassium at Stassfurt, Prussia, in 1861, and it was probably made elsewhere soon afterwards, but no description of the process had been published when it was commenced at New Haven in 1864, under instruction from Dr. A. A. Hayes, and the work has been carried on there without interruption since that time.

The process has been described and does not require explanation here: but the interchange is not so exact or complete as when potash and nitrate of soda are brought together. The products are refined nitrate of potash, containing from one part of impurity in four thousand of saltpetre, to one part in ten thousand, and common salt, pure and crude; the magnesium salts, bromide, etc., are not saved at present. The nitre is used, principally in the finer grades of gunpowder, also in medicine, in flint glass, and in small quantity for preserving meats, as well as for other purposes. In common with other domestic productions, this nitre was underrated here for several years after its introduction, and the prejudice against it was so strong, that during the war gunpowder made from it was condemned by United States *army* officers, although without effect, at nearly the same time that the *naval* officers reported very favorably and satisfactorily upon its merits.

At present its value is conceded by all consumers of refined saltpetre. An objection has been raised that it might contain nitrate of soda, but in the great number of samples tested here, this impurity, although carefully sought for, has never been detected; nor is there any reason for its presence if the saltpetre has been made with proper care.

Several other saltpetre works have been established in different parts of the country, and some of them are now manufacturing from chloride of potassium and nitrate of soda. In New Haven an average of at least a thousand tons a year has been made from these salts, imported by the proprietors principally, and several of the government magazines are filled with this saltpetre instead of gunpowder; a wise and prudent measure, storing this non-explosive source of powder, which may be converted into gunpowder in a few hours.—*American Chemist.*

GUTTTA-PERCHA.

Gutta-percha is not elastic, like india rubber. When below or at the average temperature of the air it is hard as wood, and very tough ; at a higher temperature it becomes as soft as beeswax, and may be molded into any form. The heat of boiling water is sufficient to soften it. In this condition it may be cut and united again into one piece without the appearance of a joint. Gutta means gum, and percha is an island from which it comes, so that the name of the substance amounts to the gum of Percha. Botanists have named the tree from which gutta-percha exudes *Isonandra gutta ;* it is a large tree growing in Malacca, Borneo, Singapore, Java, and the adjacent countries. The gum was at first obtained by felling the trees and collecting the exuding juice, either in vessels or in shallow pits dug in the soil, or in baskets made of leaves, the juice being left to harden under the action of the sun. More recently the trees are spared and the juice obtained from deep cuts made in them. The lumps of solid gum thus obtained are united by softening in hot water and by pressure. The raw gutta-percha of commerce is a dry, red, or marbled mass, not unlike leather cuttings which have been pressed together. When perfectly pure it is nearly white, its ordinary brown color being due to organic coloring matter. The gum is a mixture of several resins. Previously to being used, gutta-percha is cleansed from dirt by kneading in warm water, being then usually rolled into thick plates and sheets. Thus purified it has a chocolate-brown color—is not transparent unless first reduced to sheets as thin as paper, when it is about as transparent as horn. At the ordinary temperature of the air the gum, as we have said, is tough, stiff—not elastic or ductile. By the aid of heat it can be rolled into sheets, drawn into wire, and kneaded into a uniform mass with india rubber. Gutta-percha is insoluble in water, alcohol, dilute acids and alkalies, which properties, with those before given, make the gum the useful and valuable substance it is. It can be dissolved in warm temperature, sulphide of carbon, chloroform, coal-tar oil, and in a few other oils. Dry gutta-percha is a very good insulating material for electricity. It is employed for belts for machinery instead of leather, tubes for conveying water, pumps, buckets, surgical instruments, ornamental objects of many kinds, for covering telegraph wires, making ocean telegraph cables, etc. Gutta-percha is molded into tubes by the aid of machinery similar to that employed for making lead and block-tin tubing. Many objects are made from it by pressing the gum, while soft, into wooden or metal molds.—*Rural Sun.*

JELLY FROM OLD BOOTS.

The reader may stare, but Science smiles superior and asserts very emphatically that a toothsome delicacy can be made from a dilapidated foot covering. Some time ago, Dr. Vander Weyde, of this city, regaled some friends not merely with boot jelly, but with shirt coffee, and the repast was pronounced by all partakers excellent. The doctor tells us that he made the jelly by first cleaning the boot, and subsequently boiling it with soda, under a pressure of about two atmospheres. The tannic acid in the leather, combined with salt, made tannate of soda, and the gelatin rose to the top, whence it was removed and dried. From this last, with suitable flavoring material, the jelly was readily concocted. The shirt coffee, which we incidentally mentioned above, was sweetened with cuff and collar sugar, both coffee and sugar being produced in the same way. The linen (after, of course, washing,) was treated with nitric acid, which, acting on the lignite contained in the fiber, produced glucose, or grape sugar. This roasted, made an excellent imitation coffee, which an addition of unroasted glucose readily sweetened.—*Scientific American.*

EXPANSION OF HARD RUBBER.

M. Kohlrausch having several times noticed that glass flasks, closed by stoppers of hard rubber, burst, concluded that this substance must be very dilatable. This hypothesis was fully verified by experiment, for the expansion of this body was found to be about three times that of zinc. From his measures, the coefficient of dilatation for 1° between $16^\circ \cdot 7$ and $25^\circ \cdot 3 = \cdot 0000770$, and between $25^\circ \cdot 3$ and $35^\circ \cdot 4 = \cdot 0000842$. Thus, not only has hard rubber a very great coefficient of dilatation, but the latter increases very rapidly with the temperature.

This remarkable property can be applied to the construction of very delicate thermometers. Thus, with a small instrument, consisting of two strips of rubber and ivory 20 cms. long, glued togetether and fastened at one end, we obtain, at the other extremity, a movement of several millemeters for a change of temperature of one degree. The coefficient of hard rubber is equal, at zero, to that of mercury; above, it is greater. We can, then, as a curiosity, construct a mercury thermometer with a reservoir of this substance, whose changes will be the opposite of those of a common thermometer, and which will fall with an increase of temperature.—*Pogg. Ann., Am. Jour. of Science and Arts.*

NOTES.

Dental Assistants.

We have had call this spring for three or four first-class mechanical workmen as dental assistants in offices where handsome remuneration was offered.

While debating how best to serve our friends, both employers and employees, we received the following, which we insert exactly as received :

"A correspondent wishes to know if any of the Dental Colleges in this country could supply his wants from among their recent graduates.

Wanted, an assistant, able to do at least the simpler things that present themselves in the practice of every dentist. One who 'never saw any gold work done,' not wanted ; one who 'does not wish to do regulating' not wanted ; one who 'in laboratory work has never done anything beyond washing a few rubber plates, and who has never learned to temper an instrument,' not wanted ; one who doesn't understand the treatment of a simple alveolar abscess, and who regards creosote as being 'cooling and soothing,' not wanted ; in a word, however much of a 'splendid operator' he may be, if he is unable to do any other portion of the work of a dental office than to 'dig out holes and fill them up,' he is not wanted. If, however, a young man can be found, even if he does not know all there is to be known about dentistry, but who understands these fundamental points, and who has had some office experience, at least as much as is nominally required by the College prospectuses, and who is still willing to learn and to grow into a position in the same manner as his predecessors, several places are open for him, both in this country and in Europe.

If the students yearly graduating at our Colleges cannot fulfill these requirements, will it not be well to defer the bestowal of the Doctorate until they can ?"

We think our correspondent somewhat severe in his insinuations about College graduates, but still have had occasion to know that too many are looking for "soft places," and not ready to doff coat and gloves, and do what comes to be done in ordinary office practice. ED.

Illinois Dental Society.

The eleventh annual session of the Illinois State Dental Society will be held at Ottawa on Tuesday, the 12th day of May, and succeeding days, to which a cordial invitation is extended to all progressive dentists.

Penikese.

At the meeting of the Association for the Advancement of Science, Prof. Putnam gave a very interesting account of the work done in this school. Following out Agassiz's idea, text-books are avoided, and every effort is made to compel the students to original investigation. Each one receives a fish, with directions to study it externally for two days, and tell the instructor what has been observed. Then its anatomy is investigated in the same way, until finally two things have been gained—the habit of self-study has been formed, and a thorough knowledge of a vertebrate animal, formed on observation, has been obtained. One little fact was developed in this way in regard to the much-mooted "co-education of the sexes." It was found that ladies are quite capable of making original investigations, and four or five of them actually did make original observations before

any of the gentlemen began to do so. The students were mostly teachers, and numbered twenty-two gentlemen and twenty-one ladies—forty-three in all.

[*The Galaxy for November.*

Mercurial Poisoning.

A short time since, in the course of a lecture on mercury, recently delivered at Vienna, the leg-bone of a man was exhibited, whose death was said to have been hastened by mercury. On striking the bone heavily on the table, out fell thousands of little glittering globules, which rolled about on the black surface before the lecturer, collecting here and there into drops.—*Pharm. Gazette.*

Beds of Sulphur in Iceland.

The discovery of immense beds of sulphur in Iceland bids fair to make a material change in the trade in that substance, the Italian mines, according to recent accounts, having become, to a considerable degree, exhausted. An Englishman, Mr. Locke, has purchased six square miles in the region adjoining Lake Myvatn, in which are mountains of almost solid sulphur, the yellow color of which is visible at a great distance.

Red Marking-Ink for Clothing.

A red ink for marking clothes, which is not attacked by soap, alkalies, or acids, is prepared by Welger as follows:

Enough finely pulverized cinnabar to form a moderately thick liquid is very intimately mixed with egg-albumen previously diluted with an equal bulk of water, and beaten to a froth, and filtered through fine linen. Marks formed on cloth with this liquid by means of a quill are fixed after they have become dry, by pressing the cloth on the other side with a hot iron. The ink will keep in well-closed bottles for a long time without separation of the suspended cinnabar.

Cheap Galvanic Battery.

A writer in the *Scientific American* says: I am using a battery much cheaper and (I believe) more permanent than the one described in your paper of January 30. It was set up by an Englishman in my employ, of the name of Baron, two years ago, and I have used this kind of battery ever since. It consists of a cylindrical glass vessel, eight inches deep and about the same in diameter. On the bottom of this vessel a circular sheet-iron plate is placed, with an insulated wire extending from the plate over the top of the jar. This plate is covered to the depth of one or two inches with sulphate of copper. Another iron plate is suspended above the sulphate of copper, and soft water is poured in until the upper plate is covered to the depth of one or two inches. Thus made up and the circuit completed, the battery will come up to its power in two or three days; but if needed to work at once, an eighth of an ounce of sulphuric acid should be added. The plates must be arranged horizontally one above another, and both must be of iron. If the upper plate is a quarter of an inch thick, it will last a year. These iron plates work just as well as zinc and copper, and can be had everywhere at a trifling expense.

The production of precious metals by the Pacific Slope reached during the last quarter of a century $1,583.644,934, of which California mines produced three-fourths, nearly all of which latter was in gold. The amount obtained is now increasing yearly, partly from the opening of new mines, but chiefly from the introduction of improved methods of extracting the precious metals from the ores. The yield of the Pacific Slope last year was $80,287,436, against $70,236,914 in 1872. The increase is mostly in silver, a much more useful metal than gold, except for coinage.

JOHNSTONS'

Dental Miscellany.

VOL. II.——*JUNE, 1875.*——NO. 18.

"THE NEW CHEMISTRY."

Read before the Second District Dental Society of New York, by W. S. ELLIOTT, D.D.S., Goshen, N.Y.

What I shall offer you at this time may be considered only a reiteration of that which is already before the scientific world, and accepted as the most advanced truths in the department of science to which I refer. You will excuse me, therefore, if I ask your attention for a few moments while we consider a subject perhaps familiar to you all. I venture to broach it only on the ground that it has not, to my knowledge, been presented formally to this body for discussion.

In our profession we have much to do with Anatomy, Physiology, &c., and not less important for a right understanding and performance of our duties is the subject of Chemistry. It is one of those forms of force, or modes of motion, which is so intimately correlated with the elements of Life that it becomes our absolute duty to investigate its claims, that our purposes may be the more fully and perfectly accomplished.

When we speak of Physiology, we speak, necessarily, in general terms, making reference to it in the sense of a totality of function, for the phenomena is but the aggregation of individual forces, each an important factor in that which pertains to the highest form of life.

The phenomenal action of these varied agencies in the maintenance and conservation of animal function we denominate the *vis vitæ* ; nor can we ignore the claims of either constituent of this function without compromising the standard to which we would attain in a perfect life-being.

Chemical action is one of these forces, or, perhaps, if I chose to be more explicit, I should say, an expression of the one primal force which in some form or other is associated with all matter.

Chemistry, as well as other departments of general science, has made rapid strides during the past few years; so much so that the later understandings have been denominated "the New Chemistry." Through recent developments we have been given the power to read more plainly the pages of the book of Nature, and to ingratiate ourselves more thoroughly into the mysteries of Creation. Are we not thus led to feel the wonderfully inscrutable province of the Master Teacher who would thus break to us the bread of knowledge in token of a just and due appreciation of His infinitude and power over all that liveth or hath being?

To correspond with the advanced theories of the science of Chemistry its nomenclature has necessarily been changed, and it is my purpose to note this change and to tell you, according to the best of my ability, what are the features of this new departure.

The facts of Chemistry which come under our observation, so far as this science is concerned, are the only absolute truths in our possession, and as these facts develop themselves we endeavor to explain them by building theories consonant thereto. It is evident, then, that as new truths present themselves which the old theories do not explain, we must frame new ones which will cover the old facts as well as the new. This has been most ingeniously done, and constitutes the new departure to which I refer. It will also be implied that as revolutions in the systems have been noted, so may we presume that the coming time will correct the fallacies of the present, and progression still be the watchword of future inquirers.

The older chemists of this Society will be loth to disrupt the affection they have held for the favorite symbolic formulæ, for instance, of $H\,Cl$, $H\,O$, or $N\,O$ to represent hydrochloric acid, water, or nitrous oxide; yet should they pursue the evolutions of the science, they *must* sever this association and cleave to the newer and truer readings.

The enunciation of the law of AVOGADRO in 1811, and which was further promulgated by the French scientist AMPÈRE in 1814, constitutes the basis of the new Chemistry. The law is summed up as follows: "Equal volumes of all substances when in the state of gas and under like conditions contain the same number of molecules." The isolation of molecules from the mass, and their disposition according to the provisions of this law, constitutes what is called the molecular theory. It announces, in substance, the fact of a certain definiteness in regard

to these assumed ultimates; that is, that while we attribute special characteristic properties to any given substance, these properties have no control over the disposition of the ultimates when brought under the conditions referred to in the law; or, that though the molecules retain their individual characteristics, and these may be eminently distinctive, they are yet independently subject to the dynamical law which prevails to the governance of all forms of matter. I may not in this explanation be understood, or I may not have happily expressed myself to the elucidation of the subject; but it is highly important that a clear conception be entertained of what constitutes a molecule; that it is the smallest subdivided portion of any matter that retains a physical identity. Upon this recognition are based the truisms of the science.

Now any mass of matter is but an aggregation of molecules, each in itself possessing the same characteristics and properties of the entire whole, having similarly definable degrees of extension, weight, &c. The ordinary functions of the eye, perhaps, cannot decide their area, nor can the sense of touch estimate their individual specific gravity. These weights and measures are, however, none the less real, and are as satisfactory to the mind as are the computed distances of the planets from the sun, or their relative size to the earth, neither of which can be tangibly realized by any organ of the physical sense.

Imagine if you will the existence of any given mass of matter—of water if you please—and imagine also that with the proper means at hand we subdivide this mass until these minute particles—these molecules—are torn from each other's embrace, and dispersed beyond the range of their mutual influence. This accomplished, we have made such disposition of these minute particles as to bring them under the governance of the law we have quoted, a reference to which will define our position relative to this physical condition of the chosen mass. In this effort we have changed the water, by the influence of heat, to steam; that is to say, we have, by the means adopted, separated these molecules beyond the limit assigned to them while in a liquid state. Now, the water has not been at all altered in its physical properties; the molecules possess still the same features that we recognize in the mass. But we have been pleased to call these particles *ultimates.* If this be true, should we not, then, at this point rest in our philosophy, and from this basis reconstruct, if we have so determined, the science of which we treat? We *will* rest, but only preparatory to a new departure leading to newer truths and more advanced conceptions. And shall we still claim that the molecules are ultimates? So long as they retain

their identity as portions of the original, and while it is accepted that they are not further reducible, we may claim this proposition as true, and ascribe to each molecule the function which is recognized in the characteristics of any given substance. Common observation, however, convinces us that under certain given circumstances this identity is often lost to recognition and to sense, or the specially ascribed properties are mysteriously transformed into substances entirely unlike those we have hitherto observed. Under such circumstances we naturally ask, What are the causes which have nominated this loss or change, and what has become of that the identity of which was so eminently apparent?

The philosopher has learned that under no circumstances is matter or force annihilated—that whatever has existed at any period of time does now exist, and that whatsoever of energy has been made manifest through matter, is still conserved so long as matter shall continue to be. If, then, through the various changes and evolutions, a given form of matter or of force pass beyond our observation, we are yet assured that they still exist under other correlations.

We come now to a consideration of these changes, which, under favorable circumstances, may affect the molecule. Having recourse to direct experimentation, we will find, for instance, that one volume of H and an equal volume of Cl will unite to form two volumes of hydrochloric acid. Suppose the volume of H contained 1,000 molecules, and the volume of Cl also contained 1,000 molecules, together there were 2,000 molecules of hydrochloric acid. This is a matter of fact. Now what is the inference? It seems evident that each of these 2,000 molecules would contain a portion of H, and that each also contains a portion of Cl. We are led to infer, then, that each molecule of either element was divided, for now we observe 4,000 portions, 2,000 of which are from the element H and 2,000 from Cl. But we have claimed that the molecule was the smallest possible division;—this was true from a physical standpoint; but now the H and the Cl both have lost their identity, and have been resolved into an entirely distinct substance. We are relieved, therefore, from any further attempt to prove that the molecule cannot be divided. We have before referred to the dynamical energy which, it is admitted, pervades all matter, and which becomes active under favorable circumstances. In the experiment just cited, the bringing together of the molecule of H with that of Cl was sufficient to make active the static force, the energy of which was sufficient to split even the molecules, and the divided portions were forced to new and more agreeable associations. The chemist denomi-

nates these parts of molecules *atoms*. They become *his* unities, and are the points from which are evolved and around which play the wonderful role of chemical change.

Let us pursue our experimental observations a little further. In the reaction between H and O, we observe that it required only one-half the volume of oxygen to combine with a given volume of hydrogen, and while this is proved true of the mass, the assumption is forced upon us that the same fact holds good as regards the single molecule. We state, then, that the molecule, or two atoms of H unite with the half molecule, or one atom of O, and the result is a molecule of water. This may be formulated as follows: H_2, that is, two atoms of hydrogen plus O (H_2+O), or one atom of oxygen equals the sum of the two quantities, or H_2O ($H_2+O=H_2O$.)

In actual work or experimentation we can only deal with masses, and since we have nothing less than a molecule of any given matter, we cannot express ourselves correctly other than in reference thereto; therefore, instead of reducing our illustration to the half molecule of O which enters into the composition of the molecule of water, we must increase the atom of oxygen to its legitimate physical magnitude, then from this basis proceed with our demonstration, thus: a molecule, or two atoms of O unites with twice its volume—that is, two molecules, or four atoms of H—and the resultant is six atoms, or two molecules of water. Under these circumstances we must modify our writing, and express the reaction thus: $2\ H_2+O_2=2\ H_2O$, or two molecules of water.

In the case of our third favorite symbolic formula, N O, we find the same ruling holds good; here we have, also, the molecule of O (for we can have nothing less) with its two atoms uniting with two molecules or four atoms of N, and the product is six atoms or two molecules of nitrous oxide, which, as in the former case, is formulated as follows: $2\ N_2+O_2=2\ N_2O$.,—or two molecules of nitrous oxide; this, together with the formula for water, reduced to their lowest denominations, are finally written H_2O, and N_2O, that is, two atoms of H with one of O, and two atoms of N with one of O—the true symbolic representations of water and nitrous oxide after the manner of the New Chemistry.

The acceptation of the atomic theory has, however, led to a far deeper appreciation of the features of chemical action than has been thus far referred to. The reduction of molecules, though but a conception of the intellect, is nevertheless spoken of as an actuality, and we find no

impediment in our way of reconciling the various phenomena that present themselves with this assumption—regarding it as a veritable truth. In the same way we find but little embarrassment in speaking of electricity as an entity—tracing its passage from pole to pole—from the positive to the negative electrode, and yet, after all, we are positively ignorant of its real nature. The entity of atoms, however, seems more than a presumption, since we proceed to weigh and to measure them—to note their inherent method of association and the power of their affinities. It is in reference to the latter that the profounder interest in the science lies; and while the mind has gone out from the physical aspects of matter to the consideration of its essential properties, so also has it advanced from the atomic conception to the appreciation of the laws which prevail in this domain and which govern the atoms in *their* tendencies and dispositions. And yet further—the mind is led to ask, Are the atoms, now, the ultimates of our philosophy? In this we are not yet prepared to answer in the affirmative, for we have learned that even these are differentiated—they have values and these are comparative. Did we not observe in the reactions already noted that when we joined with O the element H that it required two atoms of the latter to satisfy the one atom of O? In this we see that O possessed a double value, as regards H.—In the case of the union of Cl with H there was an atom of each; here then the Cl possessed the *same* value as the H. The principle here enunciated is in modern Chemistry termed *quantivalence*, and a certain quantivalence is assigned to every atom of every molecule in nature.

H, Cl and many other elements are *univalent;* O, calcium, zinc, mercury are *bivalent;* N, bismuth, antimony are *trivalent*, &c.—as compared to H, which is the unit in value, as well as the unit in weight.

But, gentlemen, while I have pursued this subject to a point which becomes still more interesting as we advance, I am inclined to rest in the matter, hoping, at least, that I may have incited your minds to a more determined appreciation of the importance of the study and of the desirableness of presenting this and allied themes to the Society for their consideration and enlightenment. We cannot be fully up to the requirements in our practice if these subjects are to be ignored, and we ought to be utterly ashamed of our pretensions when we presume to call ourselves Medical Specialists, or Dentists if you please, and acknowledge ignorance of the principles upon which every legitimate practice should be based.

From the Popular Science Monthly.

ADDRESS TO MEDICAL STUDENTS.

Delivered to the Graduating Class of the New York College of Physicians and Surgeons, by Rev. E. A Washburn, D.D.

I am glad of the privilege, gentlemen of the Medical College, of meeting to-day so many who are masters and students in the school of science. For if, as I believe, all our studies, whether of Nature or Mind, are only chapters of one book, there can be nothing wiser in our day, when the growing mass of learning almost compels a microscopic research and somewhat of a microscopic bias—nothing wiser than at times to interchange our points of view. It is, indeed, one of the phases of that heredity, of which so much is said at present, that our callings bequeath their mental habits, so that the clergyman seems often born without the power of inductive reasoning, and the naturalist with a suspicion of all that cannot be analyzed by his blow-pipe. Yet I am sure that you are of a larger school than this; and in that feeling I venture to put before you a few thoughts on the mutual relations of scientific culture. I shall not try your patience by a treatise on the Mosaic cosmogony or evolution; and, indeed, I must ask your allowance beforehand, if I betray in my remarks that surface knowledge of gases or nervous tissues, not strange to one more busied with Greek aorists and primitive-church deposits. It is your noble calling to be students in that branch of science, perhaps the most fruitful of discovery to-day, which explores the laws of the highest organic life. If I can point out a few of the common features which give a meeting-ground with you for one who is, like myself, a physician of the soul—for studies that bear on the riddles of our mental life and the largest aims of moral education—my essay will not be thrown away.

It is plain to all that the marked feature of our modern culture is the enthusiastic study of Nature; and the fact demands our impartial thought. This change, even within the last thirty years, is a striking one. It comes in part from the magnificence of the discoveries gained in every part of natural inquiry. It comes again from the reaction of the mind, after a time of overstrained ideal pursuits; nor is it strange, when the philosophy which began with noble thinkers had evaporated at last into a misty pantheism, that we should ask a more robust sense, and a positive knowledge. It is amusing to meet to-day those who awhile ago were talking of the infinite soul in man, and are now quite

proud of their pedigree from a West-African ape. But I attribute this feature of our culture not merely to such reaction. It betokens a solid growth in the method of inquiry. Although I distinguish it from many of the theories which call themselves science, yet the principle which begins with the study of facts, verifies them by sure experiment, and rests in ascertained laws, is the key of all discovery. Our modern intellect did not, indeed, originate it. Nor can I ever admit that the great thinkers of the past have not done immeasurable service in their spheres of knowledge; rather, I claim that there is not a single foundation truth, in regard to the mind or moral nature, which was not known, even before a Plato or an Augustine. Our philosophy does not give essential truth; it only opens it in its clearer relations. The fixed stars have shed the same light aforetime, although the glasses of to-day have pierced into the nebulous fields. But it is the peculiar character of natural science, and the grandeur of its march on this high-road, which have established, as never before, its critical method. You are familiar with this in the wide range of inductive study. The knowledge of the heavens is quite another thing to us than in the day when Aristotle reasoned from the ideal perfectness of the circle to the planetary motions; and "made the world," in Bacon's phrase, "out of his categories." Or, to illustrate from your own field, the ancient theories of material and spiritual substance, which led to such fruitless speculation even to recent days, have been exchanged for exact analysis.

But this method is not confined to the interpretation of Nature; it is the common law of advance in all knowledge. Mental science must now begin with the related facts of biology and psychology, in order to rise by clear analysis to the laws of thought or will. History obeys the same principle, and it has so passed, since the day of Niebuhr, out of the cloud-land of legend to *terra firma*. Our vast researches into language have come from the dismissal of the old hypothesis of a primitive tongue and the correlation of all the facts gathered from all the kindred forms of speech. It is the same with social science. And although I am aware of the notion of many doctors, both of divinity and medicine, that theology is a fixed deposit, as distinct from inductive knowledge, and indeed that there is an eternal conflict of religion and science, yet I am bold to say that it is a vulgar error. There is a more palpable movement in the science of Nature, because it has to do with material forces, while the theologian explores the more subtile laws of thought and moral history. We do not deal with scalpel or

microscope, yet we recognize the method of analysis. It might be a curious pursuit if you should study medical history from the day of Galen, through the middle age, and note how the same speculative notions of soul and body entered into the current dogmas of the Church and the healing art. The central truths of Christianity are always the same; but Biblical criticism, the comparative study of Hebrew or Christian epochs, the domain of doctrinal thought, are growths of the human mind, and every advance has been the fruit of experimental searching. And if we have some clergymen as guiltless of modern ideas as the Englishman who moved the risibles of a scientific circle by claiming that the fossils of the caves were the bones of the rebel angels, possibly you may have a few doctors of medicine almost unable to appreciate the scientific criticism of the four Gospels.

But, as we have thus recognized this law of method as the fruit of our culture, we shall be able to see the interdependence of all these branches of knowledge. All our gains are helpful to each other. I might sum the vast history of science in a word—that it has taught us the harmony of law, not only in the correlation of natural forces, but of the moral and social forces of human life. But I look more especially at the studies which employ your profession, as they have shed such light on the marvelous secrets of the inner man. The cunning laws of cerebration; the wondrous rhythm that runs between the several powers of memory, feeling, will, and the sensitive nerve-centres; the dependence of thought on the supply of the chemical brain-food; the explanation of the riddles of our dream-life; the relation of our mental functions to the loss or decay of our organs; the phases of disease as affecting voluntary action—all these are as needful a study for the intellectual or the Christian thinker as for the naturalist. These researches have not only cured many mistakes of our psychology, but have given us sounder views of life and education. It is not too much to say that our theories of social and religious culture have been far too often affected by a partial view of our spiritual nature, which lost sight of its dependence on the body and the healthy laws of action. But while I gratefully acknowledge this debt, I hold that our scientific culture will, if faithful to its aim, lead us to a nobler knowledge of those truths that pass beyond a bald materialism. I can only touch here upon this wide subject. If I were to seek an argument against the modern deniers of a Divine Maker and Providence, I should turn to science itself as furnishing its best ground. The result of our study of Nature, it is justly claimed, is only the knowledge of phenomena; but in this claim science

has rid us forever of the notion of material substance; it has resolved all into one original, persistent Force; it has thus lifted matter into a domain above the physical, and by its own induction brought us back to the necessary truth, which we can only interpret by our own personal intelligence and will. If evolution, whatever its amazing chain of growth, is forced to admit that the principal world-stuff has in it the capacity of all the thinking, conscious, moral being begotten from it, evolution is but a vague name for the living action of a living God. And when I sum, again, our results as to the human organism, all our knowledge of the fitness of the cerebral mass and each fibre of the spinal net-work to the motions of the unseen life, so far from proving thought a function of the brain, or will a shock of the nerve-power, has only refined the body into the perfect vehicle of the indwelling spirit. Nothing is more satisfying to a believer in facts above Nature than that chapter on the "Substance of the Mind," where the apostle of English Positivism, Mr. Spencer, gives us, as the outcome of his analysis, that when we talk of material or spiritual substances, it is indifferent whether "we express those in terms of these, or these of those;" yet, as thought cannot be dissected like the gray matter of the brain, it is sounder science to say that the living force is another than the physical fact.

But I cannot linger on these questions. Enough if I look forward in this light to the most harmonious results. We need not expect at once a reconciliation of all discords. Much must be done before that is reached. The clergyman has to learn fully that the Word of God is to be studied as the oracle of the great truths of man's spiritual history, not rashly made the rule of exact science. The naturalist must learn that there are facts of conscience and of human life more sacred than the guesses of his theory, which he must touch with reverent hands. Indeed, I have sometimes thought if the clergy could ramble with Mr. Huxley over the glaciers, and Mr. Huxley would take an excursion into the fields of Christian history, we should have better clerical sermons, and better "lay sermons." Science will work its own cure at last. It is not probable that there will be less prayer on account of Mr. Tyndall's "prayer-gauge," so long as it is the bidding of the heart of man. It is not probable, if, as a witty doctor has lately hinted, we measure the varied genius of Homer, Spenser, or Béranger, by the slower or quicker respiration, that we shall read the "Iliad" or "Faerie Queene" with less delight. It is not probable that all our discoveries of the ape period will kindle our interest so much as the history we remember far better, of the struggles and divine triumphs of the full-

grown man. Let Science go on with its keenest analysis. It will return, when it is completed, to the living synthesis. If, with all our processes, we cannot manufacture a man, if even the mineral water we concoct is not quite the same as Nature brews in her laboratory, much more shall we give up the fruitless task of dissolving the ultimate facts of mind and life. I have been struck with a sentence of the late Mr. Mill, in his autobiography, where he speaks of a long stage of mental depression which destroyed his zeal for all his favorite studies. "I saw," he says, "that the habit of analysis tends to wear away the feelings. My education had failed to create these feelings in sufficient strength to resist this dissolving influence, while the whole course of my intellectual cultivation had made such analysis the inveterate habit of the mind. I was thus left stranded at the commencement of my voyage, with a well-equipped ship and a rudder, but no sail; without any desire for the ends I had been so carefully fitted to work for." That is the autobiography of our time, of its strength and of its weakness. Let such experience teach us the honest pursuit of science, but teach us also its limit. Our age will gather up the real gains of its knowledge. We shall have learned many of the laws of our being; we shall apply ourselves to a broader culture of the mind; we shall feel a more earnest interest in all aims for the improvement of the race. But we shall prize no less the treasures of letters and art bequeathed us by the past; the ideal truths which have employed the wise and good; and, above all, that Christian faith which has inspired the richest knowledge of mankind, and without which our best culture will be as dead as the fossils of a prehistoric cavern.

Such, gentlemen, is the result I anticipate for the next period of our scientific growth. Pardon me if I have given you too long or too dry an essay; but let me beg you to receive it as the conviction of one who feels a generous sympathy with all the real aims of his time. This is the best spirit of your noble profession. If you so pursue it, as honest interpreters of Nature and reverent worshipers of Him who is above Nature, you will make it a sacred ministry for not only physical knowledge, but for the service of God and man.

HINTS TO SECRETARIES.

Messrs. Secretaries of Dental Conventions, &c., we are hungry for the meat, while you too often give us the skeleton. Give us the real food your brethren provide you, and keep the dry bones for future

home use. While it is important for you to keep a strict record of your organization, list of officers, speeches of laudation, and various matters of local interest, it is mainly important for us to know "What's the news, dental wise?" Give us every important suggestion, improvement and experience, in a clear, concise manner, and we will thank you.

For one, I am disappointed when you tell us that Dr. Blank's report on the properties and preparation of various amalgams was an able and instructive essay, and do not inform us what important facts made it "able and instructive." What do we care that the evening session was occupied by the reading of a paper by Dr. —— upon Rigg's Disease, and its discussion by Drs. A. and B? Rather tell us what Rigg's Disease is, and what was said about it that may benefit us poor benighted ones.

Nearly all the report some Societies make is the list of their officers, topics of discussion, and a very generalized statement that the meetings were very interesting, &c.—not a word of specific enlightenment upon the theory or practice of dentistry.

Messrs. Secretaries, give us the meat, and lock up the skeletons in the archives of your societies.

T. B. Welch, *Vineland, N. Y.*

NEW YORK ODONTOLOGICAL SOCIETY.

The Society met at the residence of Dr. E. A. Bogue, on Tuesday evening, March 16th, 1875, President A. L. Northrop in the chair.

Dr. Kingsley presented a case of irregularity and described its treatment in the following remarks:

I have here the models of a V shaped dental arch in the mouth of a Miss thirteen years of age. An examination of the cast taken before any treatment was commenced (see Fig. 1) shows a true V shaped arch, and is not to be confounded with the *protruding arch* of an upper jaw in which the six front teeth all stand forward on a broad and flattened curve.

It has been stated that this V shaped type shown in this model is the result of thumb-sucking, or some other like and equally pernicious habit, but it is a misapprehension of the facts. I have never seen a case of thumb-sucking that produced the true V shaped dental arch, and I *have* seen a child with an undoubted hereditary tendency to a V shaped arch in which the habit of thumb-sucking obliterated the pointed or V

shape, and instead thereof the anterior portion of the arch was widened and correspondingly flattened, while the sides, being held by the articulation of the lower teeth, remained unchanged. In the case before us the deformity of the upper jaw was not in itself nearly so pronounced

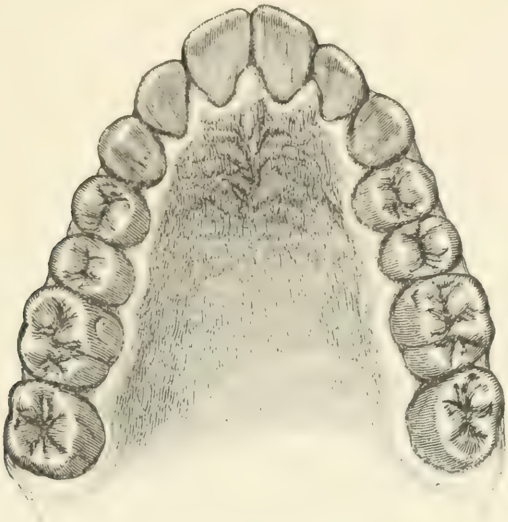


FIG. 1.

as in many other cases, but the effect produced upon the external features was very marked. In Fig. 2 is seen the profile of both jaws with the articulation of the teeth.

So great a disparagement between the incisors of the upper jaw and

FIG. 2.

the incisors of the lower jaw in the mouth of a child whose features were otherwise remarkably regular, produced an incongruity amounting to marked deformity. A study of the profile did not show that the upper lip was so much in advance of a regular outline as that the lower lip, chin, and lower jaw were all receding and seemingly out of

place. Nevertheless, the occlusion of the teeth showed that their grinding surfaces articulated most admirably with their antagonistic neighbors.

The dental arch of the lower jaw was well formed, was not contracted at the sides, but was round, and of normal development, and in this respect was unlike any lower jaw that I remember to have seen associated with a narrowed and V shaped upper arch when the grinding surfaces articulated so accurately.

In all cases which I have heretofore observed of a well shaped lower arch associated with a V shaped upper one the articulation was not good ; the lower bicuspids and molars articulated outside the cusps of their superior antagonists. I was puzzled over this anomalous state until my plaster models were made, (as represented in Fig 2) and with a better opportunity of studying the articulation, I discovered that the lower teeth were articulating one tooth behind their normal place in the upper jaw ; that is, the first bicuspid of the lower jaw was shutting between the bicuspids of the upper jaw, while in all cases the normal occlusion requires that the lower bicuspids should shut in advance of their correspondents above. In my plaster models I was able to see the perfection of articulation in this state of mal-occlusion, and also to see that the movement to shut the lower jaw farther forward showed the upper jaw too narrow to receive it. It was thus that I obtained a clear insight into the *cause* of the deformity.

The tendency to a pointed arch was inherited from the child's father, but it was really of so slight a character as not to amount to a deformity. This tendency undoubtedly exaggerated the peculiarity in the child, as I have elsewhere argued that the causes which produced an irregularity in development, will, if continued, exaggerate the peculiarity by transmission. And so in this case the V shape of the upper jaw was more marked in the child than in the father, but not sufficient to produce such a deformity of external feature if the lower jaw had persisted in shutting forward in its normal place, and of course outside in the bicuspid and molar region, as in most other similar cases.

The remedy evidently lay in the widening of the upper jaw until the lower would be received in its forward and natural place ; and resolved itself, therefore, into three elements, viz. : widening the upper arch so that the lower teeth could not articulate as they had been accustomed to ; secondly, compelling a new articulation in an advanced position, and thirdly, flattening the pointed and projecting appearance of the incisors.

The appliance used was of the simplest possible character, and is shown in Fig. 3.

It was a thin plate of vulcanite, covering the roof of the mouth, fitting closely to the necks of all the teeth except the central incisors, and sprung into place. Two slots, as seen in the engraving, were cut through the plate as a convenient means of attaching two rubber rings cut from small elastic tubing. A piece of stout thread was passed through both rubber rings; the plate was introduced in the mouth, and the thread drawn forward between the central incisors and tied over a little crossbar lying horizontally about the middle of the crowns, at their proximal edges; this crossbar was the unburnt end of a match stick, and less than an eighth of an inch long. The engraving shows the rubber rings only under about half tension—in use they were drawn clear up to the lingual surfaces of the centrals, but of course the tension depended much upon the size of the rubber tubing and the strength of the rubber.

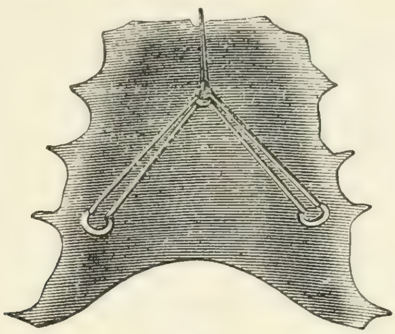


Fig. 3.

At the time of the introduction of this appliance I inserted thin wedges of rubber between the teeth on each side in the three spaces between the canine and molar. How much these wedges contributed to the correction of the deformity I am uncertain, as after two or three days I became fearful they might operate disadvantageously, and I removed them.

The sole appliance, then, depended upon for correction, was the vulcanite plate, as seen in Fig. 3.

Two weeks from the same hour at which I attached the apparatus I took the casts which are represented in Figs. 4 and 5. At the end of another week I introduced the final retaining plate, and pronounced my work at an end. The articulation of the lower teeth in their new found places was nearly as perfect as in the former condition, and in process of time will, by accommodation, become quite so. It is now impossible for the teeth to shut in their former and abnormal places.

It needs no words to describe the change in the external features; the casts shown in the engravings sufficiently indicate how the profile was changed within three weeks, from a marked deformity to an equally marked and pleasing regularity.

To an unreflecting mind the results accomplished by so simple an appliance may seem incomprehensible, but the results are only the logical sequence of the scientific application of universally known laws and facts. The power here applied to the median line was of precisely

FIG. 4.

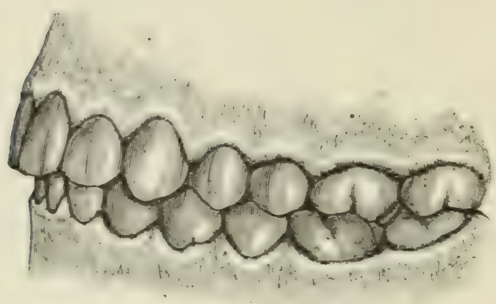


FIG. 5.

the same character as the placing of a load of sufficient weight upon an arch to crush it. As the arch flattens in the centre under the weight, it must bulge at the sides until the whole collapses in ruin. But before the *disorganization* of our dental arch arrives, we apply our retaining plate, which in this case was like the regulating plate, but with the rings nearer to the front, which were drawn over each central, simply to hold them from springing forward, and all the other teeth were locked by them.

Dr. W. H. Dwinelle showed model of a mouth, impression taken at seventeen years; the upper incisors projecting one-half an inch beyond the lower; the superior arch narrow and contracted, and the teeth crowded together. The inferior first bicuspids projected laterally and far out of the normal arch so as to push the sides of the mouth out prominently, at the same time so far opening the corners of the mouth as to induce a constant drooling therefrom. The general appearance of the mouth was bestial and disgusting. The superior canines were not erupted, yet showed their points, but located so far up that the capsules containing their crowns must have impinged directly on the bone, immediately under the canine fossa, thereby indicating, beyond all question, that, not only had their eruption been detained for several years, but that, up to that time, no formation of roots could have taken place.

An effort was made, not only to regulate the teeth at large, but to gradually draw the cuspids down to their place, their roots *forming* the while, and at the same time so delicately to manipulate their progress as not to induce the death of either of them. This was successfully accomplished, as was indicated by a cast taken eighteen months afterwards, showing, not only that the teeth were regulated generally, but that the superior canines were in their normal place, prominently and fully developed. The loss, however, of the superior bicuspids, was involved in the treatment, which sacrifice, he now thinks, was unnecessary.

Dr. Dwinelle has found in regulating teeth that firm, powerful, and continued direct pressure induces the least inflammation and consequent risk. He claims to have invented the combining of zinc with steel jack-screws, to prevent their rusting in the mouth. He introduced the first steel jack-screws of varied patterns to the profession twenty-three ago. They have been in general use in the city for more than twenty years.

Dr. Dwinelle presented for the consideration of the Society several cases of *Dental Anomalies.*

Case 1.—In 1857 a gentleman, aged 55, presented himself for treatment. Found all of the teeth in the left superior maxillary sinus necrosed and loose. The alveoli and all of the maxilla on that side, involving the entire antrum and malar process nearly up to the orbital plate was in like condition and rapidly exfoliating. Put the patient under chloroform and removed all of the diseased portion without interfering with the hard palate, leaving a large portion of base of antrum

exposed, so much so the finger could readily be introduced. Subsequently, portions of the turbinated bones were found to be dead and were removed.

Kept the wound open with lint and dressings. Treated with simple dressings of port wine, dilute creasote, iodine and dilute sulphuric acid. After three months, wound healed and closed. The contour of his face was restored afterwards by artificial means, plate teeth, &c. Cause, tertiary syphilis. Kept him under constitutional treatment of iodide of potassium for several months thereafter. The patient now is in perfect health, with no recurrence of symptoms.

Case 2.—In 1872, a gentleman came under observation, and upon examination the following lesions were discovered. Entire palatine arch necrosed. All of the velum destroyed, except a portion of its posterior border, which was entire, together with the uvula. Removed the diseased parts, together with all the teeth. Subsequently treated by usual remedies after all parts were fully restored. Replaced the whole by artificial denture, which, at its posterior border, was so grooved or split, that when the whole was placed in the mouth, the patient could with his tongue so manipulate the remaining soft palate into place, that, when thus adjusted, it seemingly, had all the advantages of a normal and full-fledged velum. Cause, tertiary syphilis.

Resorted to specific treatment, as indicated by the primary cause, which proved perfectly successful. The patient, who was seen recently, reports a continuance of good health from the time of the operation.

Case 3.—July, 1871. Patient forty years of age. He had been under treatment for syphilis for several months. The four superior incisors were comparatively loose; the upper half, third, and quarter of the roots of each necrosed and protruding from the gums. All the mass of the alveoli and bones above the points indicated, including the nasal spine and anterior base of nares on either side disintegrating and exfoliating. The whole was removed, and after the operation a free passage was found an inch broad up into the nasal fossa. On examination the doctor found, to his surprise and satisfaction, the periosteum of each of the incisors *below* the necrosed parts, healthy, and to all appearances normal, the periosteum of the roots extending higher up on their posterior sides, than anteriorly. Acting upon this hint, the doctor amputated them all at a beveled angle, so as to preserve all the remaining periosteum possible, as well as to ensure all practical permanency to the roots. The lesion was treated with the usual dressings, and a cure was established in a few weeks. At the same time he filled two

of the superior incisors with gold. There is no doubt but that the periosteum of both the alveoli and bones of the parts removed must have been left comparatively intact, as the most of the hard parts have been seemingly reproduced. The patient was seen last summer; all his teeth were found quite firm in their places; the gums closed over their roots and extending down to their proper line, and all the parts apparently healthy.

Referring more strictly to *Dental Anomalies*, Dr. Dwinelle, continuing, mentioned:

Case 4.—In the fall of 1861, a distinguished member of our profession brought to the doctor a gentleman, aged about fifty-six, whose case presented a most singular anomaly. He had been suffering for several weeks with a most painful and distracting attack of facial neuralgia of the left side. He had applied to all the principal physicians of this and neighboring cities for relief, but without avail. So severe and incessant had been his sufferings that for six days and nights he had been without sleep, and he was so wrought up to a condition of frenzy and nervous apprehension, that it was with difficulty he could be induced to take a seat in the operating chair, and submit to an examination. On looking into his mouth the doctor was astonished to find that the patient was wearing, and had for years worn an entire upper set of artificial teeth, all his upper teeth having been removed five or six years previously. The gums presented a healthful and natural appearance, and the doctor was utterly at a loss to divine the source of discomfort. The remembrance of a similar case, however, which the doctor had treated several years before, which will be referred to further on, induced him to look at it again more critically, when on the left side was found, immediately under the malar process, and within the alveolar arch, a somewhat marked protuberance or elevation. On pressing it gently it gave no indication of pain, but on bearing upon it with considerable force, his agony was so intensified that he bounded from the chair with the shriek of a madman. At once diagnosed the cause to be a tardy and inverted molar tooth. As soon as the theory arrived at, and remedy were made known to the patient, all his timidity left him, and he entreated that the operation might be commenced forthwith. With a strong lancet, a crucial incision was made in the centre of the protuberance, down to the bone. After dissecting back the flaps thus formed, the superincumbent osseous casing was removed with bone forceps, when, as had been divined, a molar tooth was found with a *breach presentation!* With a pair of strong extracting forceps the truant thing

was literally torn out by the roots. "If my poor suffering friend," says Dr. Dwinelle, "was mad before, he certainly was so now ; but it was with the joy and gladness that came from the entire relief which I had afforded him from such unusual suffering. Glory ! Glory ! ! seemed to be the only word he could command. He danced about my rooms like a maniac ; he embraced me affectionately, and in spite of all my efforts at a kindly self-defense, with his gory mouth he covered me with many and varied manifestations of his sanguinary gratitude !" The patient has been in the best of health ever since, and was the popular, useful, honest, and universally beloved Collector of our Port for many years afterwards.

Case 5.—The anomaly of the following has already been incidentally alluded to. In 1855, a lady, the wife of an eminent jurist of Washington, was recommended to me as a sort of "court of final appeals," to give my opinion upon a case of "bone cancer," which many eminent physicians had shadowed her life with, and which she had nursed for more than a year past, and so far believed in, that she was looking forward to a speedy dissolution. She had been wearing a full upper set of artificial teeth for four or five years. On removing them for examination I found an apparently ugly looking sore, which proved afterwards was due to stupid treatment of nitrate of silver, and other unnecessary irritants. The centre of it was apparently bone, but on breaking off a small portion of it, and placing it under a microscope, the indication of enamel rods verified the true nature of the case. With the light of the fact that a tooth was located there, I was enabled, on closer examination, to classify it, and to presume that, by its obliquity, it so far projected into the nasal fossa, that on its removal blood would probably flow from the nose, and so predicted. The tooth was lying on the left side of palatine arch, projecting obliquely across the median line, in the direction of the first molar on the right side.

Extracted the tooth—a superior left incisor. Blood flowed copiously from the nose. Dismissed the patient wholly cured in a few days. Patient wore the same plate continuously until about three years ago, when she died of pulmonary consumption.

Case 6.—In 1859, Mrs. S., a lady of fifty years, came to me with what she had been persuaded to believe was a true "cancer of the upper jaw." On examination I found the seat of her troubles in the left superior maxilla. The cheek on that side was greatly congested, swollen, and was of a deep purple color. Her eye was so diverted from its line of axis, and so pushed out of its orbit, that for a long time it had been

useless to her as an organ of vision. A copious flow of offensive pus was continually oozing from the nostril. On taking hold of the teeth firmly on that side I found the entire maxilla could be perceptibly moved, and that it was evidently in the process of exfoliation, and of separation from its articulations. I found the cause in the second molar of that side, which was dead, and evidently penetrated into the antrum. I removed it, together with considerable dead bone, and found the entire antrum alarmingly diseased. After protracted treatment, local and constitutional, she was finally restored to health, in which condition she now is. It was two or three years before the maxilla *settled back* to its place, and the eye became normal in all its functions, and even now, occasionally, on taking a severe cold, reminders of the old destructive inflammation manifest themselves in the slight tumefaction, the flushed cheek, impaired vision, and the partial closing of the nares.

Case 7.—In 1869, Mrs. P., of this city, had been suffering for a long time in a peculiar and anomalous way; her case had baffled the skill of our best physicians and surgeons at home; she had gone twice to Europe for relief, and had exhausted without avail all medical ability abroad, and had come home to die. All efforts thus far had failed to divine the cause of her troubles.

Bronchitis, phthisis, dyspepsia, and other diseases, were respectively assigned as the cause. The physicians of London and Paris all agreed, however, that she was going into a decline, and at their advice she had just spent an entire season at Aix-les-bains. Immediately after her return in 1869, she was recommended to me by her family physician here in this city. I found her a lady of sixty-five, very much emaciated, extremely nervous, with rapid pulse, without appetite, an excoriating and offensive secretion accumulating in the throat, which she was continually endeavoring to dislodge by violent fits of coughing. Her left eye was protruding from its socket, and no longer acting in harmony with its fellow, had assumed the character of exaggerated divergent strabismus. The nasal passage on the left side was completely closed, and she informed me that she had enjoyed neither the sense of taste or smell for the last two years. Obviously she was falling into a rapid decline.

It required but trifling reflection, with all of these palpable facts and symptoms before me, to diagnose *disease of antrum.* I found but few teeth in the upper jaw, but I at once selected a dead second molar as the cause of all the trouble. It was standing alone. Bending a silver probe to the proper curve, I passed it behind its posterior buccal root

up into the antrum. Pressing the probe still further, and letting it take its own course, it passed up a distance of at least four inches before it met with any obstacle. It must have passed through the antrum into the nasal passage, and finally impinged against the *cribriform plate.* I removed the tooth, together with all the rest in the upper jaw, and cut away a considerable portion of the base of the antrum, in order to clear away the débris of dead bone. Abundant flow of pus from the antrum. Washed it out freely with warm water and stimulants. Next day treated in similar way with variation of use of dilute carbolic acid, which I injected through the antrum into the nasal fossa. At this time, large quantities of degenerated pus came away, which had been lodged and cemented against its walls. Treatment varied, and daily repeated until a complete cure was established. Tumor in nose, obstructing its passage, reduced by nitrate of silver. But no skill of mine could induce granulations to close the orifice, which, though reduced to three-eighths of an inch in diameter, was still opening into the antrum. With a curved scalpel I made a circular flap around the orifice down to its margin. Then gathering it up and inverting it, I plugged the opening with it, thus bringing its raw edges together, securing it afterwards with a point of silver suture. Subsequently, I inserted a full set of upper artificial teeth for the lady, which she is now wearing, in the full enjoyment of health and masticatory comfort!

Case 8.—In the summer of 1859, Mrs. W. called to consult me in regard to a suspicious and rapidly growing swelling on the left side of the lower jaw. On examination I found the two plates on that side of the inferior maxilla widely separated, thinned by absorption, with an unpromising looking sore immediately behind the twelve year old molar tooth, from which was discharging an ichorous fluid. Externally I found a tumefaction, particularly prominent just above the angle of the lower jaw, at a point corresponding to a position back and below that of the dens sapientia. On pressing the part referred to, I found it comparatively soft and yielding. From these indications I diagnosed a *dentigerous cyst*, with an inclination towards *osteo-sarcoma*, induced by an inverted wisdom tooth. Inasmuch as the tooth could not be erupted in the normal way, nature seemed to be making an effort to get rid of the foreign body by exfoliation through the cheek.

With considerable difficulty, for the jaw was so constricted by infiltration, and consequent rigidity of muscles, that it could only be opened to a limited degree, I succeeded in dissecting through the soft parts and bone, down to the tooth, which I removed by the roots, the crown

being inverted. Subsequently I removed portions of the walls of the cyst, and treated with stimulating injections, with the hope of inducing a cure by granulation. I found, however, the chamber enlarging rather than diminishing, and progressing forwards under the second and first molars. I then removed the second molar and treated as before, but without success. I finally removed the first molar, but still with no abatement of symptoms. By this time the soft parts within the walls had everted themselves, and had taken on an angry, congested and fungus appearance, extending from just below the sigmoid notch down nearly to the second bicuspid, completely covering the expanded body of the jaw, and spreading down the inner side below its lowest border. In the centre of the mass was a circular collection of papillæ, quite half an inch in diameter, which had a very forbidding look, and was provokingly suggestive of cancer. After consultation with several distinguished physicians and surgeons of this city, it was decided to excise the entire diseased portion of the jaw, from its ligaments down to the second bicuspid. In December, 1860, I put the patient under the influence of ether, and Dr. J. W. Gouley, of this city, assisted by myself, performed the operation.

An incision was made from the condyle of the jaw, downwards and forwards to a point opposite the mental foramen. The soft tissues were dissected back, and the severed arteries were taken up in their order, and tied. With a chain-saw the bone was divided immediately behind the second bicuspid, then the whole was torn from its ligaments, in order to guard against hemorrhage, and ensure the safety of internal carotid artery. The wound united by first intention. The patient rapidly recovered. It was my intention to supply the loss by an artificial fixture, but such a mass of cicatricial tissue remained, that I deemed it inexpedient. The contraction of this tissue drew the remaining portion of the jaw so far back of its true articulation that for two years it could not reach its normal position by half an inch. It subsequently adjusted itself naturally, when I put a large crown gold filling in a molar tooth on the opposite side of the jaw. She remained in perfect health until five years afterwards, when she died of pyæmia, which, however, had no connection with the disease of the maxilla just described.

With a liberality and breadth of nature which commands our respect, she voluntarily proposed, in the event of her decease first, to present the remaining portion of her jaw to Dr. Gouley and myself, as a contribution to the science that had saved her life.

After a post mortem was made in her case, the remaining inferior maxilla was removed through the mouth, without in any manner disfiguring the face; cotton was filled in to supply its place, restoring the contour completely.

For several years we had the unusual opportunity of exhibiting the morbid and healthy portions of the jaw together. But when the New York Medical College in Fourteenth Street was burned, it was destroyed with the Mott collection of morbid anatomy.

Dr. Gouley fortunately had taken the precaution to have a fine colored drawing made of the morbid spcimen, which, with the maxilla removed after death, I have the honor to present for your consideration here this evening.

It seems to me a fitting time to make some closing reflections upon what I have revealed to you to-night, and that while in the name of humanity we enter our protest against the *ignorance of the learned*, we should at the same time make newer and higher resolves that if it is left to our profession to supply the manifest deficiencies of another, we should endeavor to do so with such a degree of comprehensiveness and skill as to reflect such honor upon and respect for our profession that in all diseases pertaining to our specialty, we should be the first to be consulted. I claim that the whole range of the functions of the *trigemini* should be our own peculiar field of labor, our right and our true heritage.

To show how indispensable our profession is to the well being, the comfort, and to the life, indeed, of our patients, let us take a hasty review of the few cases referred to this evening.

Case 1 was already in the hands of one of our first surgeons in this city. He intended to operate, but deferred it "till he was better satisfied of the nature of the case." The cause to me was apparent at a glance. I operated at once, and such men as Drs. Post and F. U. Johnston told me it would have been dangerous to have deferred the operation twenty-four hours. His subsequent prolonged enfeebled condition verified the statement. My friend, the surgeon, whom I had anticipated, was hardly inclined to forgive me for operating, because I was a dentist; but when he learned I was an M. D., he became duly reconciled.

Case 2 shows that our peculiar art has placed the man where he is to-day, a happy, healthful, but *ungrateful* man; but no matter, it was done for humanity; the record is good all the same.

Case 3.—To say nothing of the surgery here, where would you go but to our profession for the mechanisms that would set this person to eating, drinking, and talking again like a man!

Case 5.—A *cancer*, sure, and a *bone* cancer at that, till a humble dentist found it was only a tardy and harmless tooth, violently appealing for extraction.

Cases 6 and 7.—How deplorably, I had almost said proverbially, ignorant the medical profession are of diseases of the antrum. It has been reserved for some of the more prominent members of our profession to make an entire revolution in this department of surgery, and there are some present here to-night who are more learned, are more successful operators, and are better authorities in this specialty than any outside of it.

I refer to these things in no spirit of vain-glory or boasting ; I simply state them as facts. Let us humbly accept them as such, and press forward to the highest expression of duty.

On motion, the thanks of the Society were tendered to Dr. Dwinelle for the presentation of these cases.

Dr. Charles E. Blake exhibited a case, containing a set of forty-five rubber dam clamps, so constructed as to be applicable to every style of tooth, and any size cavity, in any conceivable situation ; together with a pair of forceps for their application.

S. S. White exhibited a new mallet, constructed so as to be attached and used with the S. S. White dental engine. Adjourned.

Wm. Jarvie, Jr.,
Recording Secretary.

OUR LONDON LETTER.

London, April 17th, 1875.

Editor Dental Miscellany :

Sir : It is now some little time since I ventured to trouble you with any news from this side of the water. Perhaps there is plenty to write about, but I fear I have been out of the way of hearing it lately. We cannot always be wandering about by the green pastures and still waters of gossip, and even a vagrant has to do a bit of work sometimes. I have, however, had my attention called to the brave doings of the Odontological Society of New York, and cannot help sending, through your journal, my congratulations to those who seem to have worked so hard and successfully in organizing a series of meetings which have yielded such good results. Of course, the congratulations of so obscure an individual as I can be of no importance either to those who managed or to those who had the good fortune to take part in the meetings, bu

then I think that, as I am usually so unable to form opinions for myself, I must have heard what I have just written expressed several times by others who are well qualified to judge, and so the matter has become impressed upon my mind, and now I transmit the impression to you.

I may venture an opinion as to the handsome volume of Transactions issued by the Society. I do not think it requires a great power of intellect to arrive at a very high opinion of its merits, both as to the quality of the matter and the get-up of the valuable book, of which, as an addition to his library, every dentist ought to be proud.

The Chronicles of the Odontologues have caused some amusement amongst us here, although the unfortunate editor of the *British Journal* has been gravely taken to task by some of his constituents for allowing such a parody of the style of holy writ to appear in his journal. You must know that we do not take so many liberties with old things as your people do. We are old world folks, and have not shaken off that veneration for the past, particularly for what is good in the past, in which we have been educated. Hence, I am not surprised that some have only seen in the "Chronicles" something which ought not to exist. The Editor of the *Journal* I know holds the Bible from board to board in the highest reverence, but he considered it his duty as a Journalist to show whatever was going on in the profession likely to prove interesting to his readers. I hope further Chronicles may appear, telling us all about your doings, as many of us here take a lively interest in the progress of the profession in America. Indeed, we are now getting so well mixed up that every step on either side must be of interest to the other. The efforts towards a higher standard of education, which seem to actuate many of the gentlemen who spoke at the Odontological meetings, are to us here of a most satisfactory nature. I will not go so far as to apply to ourselves the moral of the proverb of the hares and the frogs, but it is somewhat consolatory to us in our difficulties to find that the same difficulties and troubles—and perhaps greater ones—beset the path of the more advanced members of the profession with you, as surround us here.

We have recently received a great blow to our hopes in reference to the admission of gentlemen in practice to the examination for the L. D. S. of the Royal College of Surgeons. This examination was instituted some ten years ago, and it allowed men who had been in practice before a certain time to come up for examination without having gone through a curriculum. This privilege was only to exist for a short time, after which all who presented themselves must have followed the

prescribed course of study. There was, however, a further condition attached to the privilege of passing either without or with a curriculum; that was, that the candidate had not advertised for four years previously.

Now, as the whole thing was an experiment, many men in practice held aloof from the movement, and others, not believing in its success, continued to advertise as before. The diploma has been very successful, and is becoming more so as its value gets better known. Hence arose a desire among many in practice to procure it. Some years ago a movement was started—principally by the editor of the *British Journal of Dental Science*—to get the College to reopen its doors to gentlemen who had commenced their dental education previous to the first issue of the Dental Diploma. Looking forward to the success of this measure, many men ceased advertising, in the hopes of getting in for examination. When the time arrived it was found that the College, although granting the prayer of the petitioners as to dispensing with the curriculum, had retained the old dates relating to the advertising, so that unless a man had desisted from advertising, not four years, as was the condition ten years ago, but from that time up till this, *i. e.*, fourteen years, he was not received as a candidate. I need not say that this decision has had the effect of making many weary of well-doing. They have had the only path—as they suppose—of respectability closed upon them, and they have gone back to act in the spirit of the man who found his house swept, and to become worse than before.

We have already celebrated the birthday of our Dental Hospital in Leicester Square. It seems but yesterday when I sent you an account of the opening of the Institution; yet a year has passed—well, we must not moralize; if we begin on that line we may never get to anything else.

I must now close my letter with a piece of news which will carry a pang to the heart of some of the members of our profession in your country. Mr. E. Sercombe died last Wednesday, April the 14th, at the early age of forty-eight years. He was well known to many of the profession in America, either by correspondence or personally, and to be known was to be known favorably. He was a member of the Royal College of Surgeons, and when the L. D. S. was established he at once presented himself for examination. He was an enthusiast in everything pertaining to the advancement of his profession, both educationally and socially, and ready to test whatever was new in practice. Last year he was President of the Odontological Society, but was interrupted in the course of his duties by ill health. He however recovered sufficiently to take the chair at the close of his term of office, and high hopes were entertained

of his health being re-established; but, like many other human hopes, they were not realized. He is a great loss to the profession. He was honest and fearless in the expression of his opinion, and seemed to fill the gap between the older and steadier and the younger and more energetic—though perhaps less experienced—members of the profession, and from his generous and open manner, and his high social position, he was looked upon as being likely to win back many who had fallen away beneath the struggle for improvement, and to induce, if not to consolidate unity, where before there had been division. The busy world will roll on, but it will be hard to fill the place of Edwin Sercombe in the ranks of Dentistry. VAGRANT.

From the Scarborough Express.

THE TALE OF A TOOTH.

CURIOUS ACTION BY A SCARBOROUGH DENTIST.

PEACOCK *v.* HARRISON.—This was a curious action, in which much interest was manifested during the whole of the time it was under hearing. It was a case affecting the charge of a local dentist, in which the plaintiff, Mr. Charles James Peacock, dentist, Scarborough, claimed the sum of £4 4s. from the defendant, Mr. J. W. Harrison, timber merchant, Cottingham, near Hull, for filling one of his daughter's teeth, and operating on another tooth, the operations lasting four and a half hours, in October, 1873. The defendant's daughter is Miss Mabel Harrison, who had been a pupil in Miss Stephens's boarding-school, Denmark House, Scarborough. It was objected on the part of the defendant that the charge was excessive, and defendant had paid one guinea into court, pleading that that was fair and reasonable compensation to the plaintiff. For the plaintiff there appeared Mr. Warner Sleigh, (specially retained), and Mr. Haigh, instructed by Mr. H. O. Wellburn, solicitor; Mr. John Smith was counsel for the defendant, instructed by Messrs. Cornwall, Watts, and Crowther.

Mr. Sleigh opened the case in a speech of much ability and considerable length. The plaintiff was, he said, a gentleman who must be well known to the jury, for he had deservedly gained during his course of

[An undue amount of space has been given to the report of this trial, since it is in no way peculiar, and involves no new points of importance. Still, as showing something of the present state of feeling regarding dental fees in an English town, we trust it will be read with interest sufficient to justify its publication. ED.]

practice a very high reputation for skill, patience, knowledge, and success in his profession as a dentist. He had been educated as a dentist, and he had received his diploma from a college which existed in America, and which he (the learned counsel) was sorry to say there was nothing like in this country—it was a college for the study of dental surgery. Having received that education, having passed that college, and having got his diploma, he had been practicing in England for some years. His fee was now a guinea an hour, and it was well known that that was his charge. Mr. Peacock, from his skill and experience, thought he had a right to make this charge, and it was one that had been for some time ungrudgingly paid by his patients, who considered it a fair and proper charge. The defendant was a gentleman who resided in the neighborhood of Hull, and in the month of October, 1873, his daughter, Miss Mabel Harrison, was at school at Scarborough—at the seminary of Miss Stephens. She suffered there very much from toothache—several of her teeth being in decay—and on the advice of Miss Stephens she sought the permission of her parents to go and visit the plaintiff, so that one or more of her teeth which were decaying should be stopped. The requisite permission was given, and on the 13th of October she went to the plaintiff's residence to go through the operation. She was there several hours, Mr. Peacock and his assistant performing two distinct operations on her. One was the filling with gold of one of her jaw or molar teeth, whilst the other was preparing the next tooth to it, which was a dead tooth—so that it might be operated upon at a future day. The two operations were not completed under four hours and a half, and Miss Harrison made an appointment with the plaintiff that she would go on the 15th and have the second tooth further attended to. That appointment was not kept, however, and on the 24th the plaintiff got a letter sent him by Mrs. Harrison, asking him how long he would take to stop her daughter's tooth, and stating that she should not send Miss Mabel a second time unless Mr. Peacock would say how much he was going to charge. It would be for the jury to say, but he (the learned counsel) contended that the fair interpretation to be put upon that letter was that Miss Harrison's parents, or at any rate, Mrs. Harrison, knew that the plaintiff was in the habit of charging so much an hour ; indeed, he should be able to prove beyond that, that they must have known it was a guinea an hour. Well, to go back to the 15th, the appointment was not kept, but for that, though plaintiff was in the habit of making his engagements a long time in advance (owing to the extent of his connection), and charging a guinea if they were not

kept, he had not made any claim. He claimed four guineas for his work on the 13th. The bill was sent in in the ordinary way to the defendant at Christmas, 1873, but payment was not pressed, and the account stood over unsettled. They would have thought that if the defendant had then thought of contesting the charge on the ground that it was unreasonable, and under the belief that he would be justified in so doing, that when the bill was sent in he would have then said something. But no; there was no repudiation, and the thing ran on until the summer of 1874. The plaintiff then sent, in the usual way with overdue accounts, a notice to the defendant, which intimated that he would be glad if he would pay, and it was in reply to that that he received the following communication:

Cottingham, near Hull,
MR. C. J. PEACOCK: 15th May, 1874.

SIR,—I expected to have been in Scarbro' before this time, and to have called upon you respecting your charge of four guineas for stopping one tooth.

I was brought up a surgeon, and have stopped teeth, and drawn hundreds, but never in my professional experience heard of such a charge. If you reduce it to one guinea I will pay it; this is 10s. 6d. more than I ever was charged—I am, yours truly,

J. W. HARRISON, M.R.C.S., L.A.C.

In the above letter, said the learned counsel, Mr. Harrison went out of his way to falsify the facts, for he here said plaintiff was charging four guineas for stopping one tooth, when the fact actually was, as he had stated, there were two operations, viz., the stopping of one tooth and the preparing of another. To the above letter Mr. Peacock replied as follows:

SIR:—Before your daughter came to me she knew from Miss Stephens that my fee was a guinea an hour. It took two of us four hours and a half to perform the important operation, for which I have only charged four guineas. My practice is much larger than I am able to attend to, and if I had never seen your daughter some one else would have occupied the time I devoted to her. As regards the truth of my statements, I refer you to Miss Stephens. Having rendered your daughter the service of which she stood greatly in need, in the way of my profession, to the best of my ability, I now call upon you to satisfy my demand for just compensation for the time, labor, and what skill I may possess, I have given to her case. Yours obediently,

C. J. PEACOCK.

That, the learned counsel held, was a fair and gentlemanly way of putting the matter to defendant, and a way in which a fully qualified

professional man, who had given his time and his talents, was entitled to put it. From that time Miss Harrison was removed from Scarborough, and defendant, he supposed, now imagined that he could ignore plaintiff's claim, because he took no notice of the letter just read. He (Mr. Sleigh) could not help thinking that the defendant might at any rate have decently acknowledged the receipt of the communication, but he had not thought it worth while to reply, and had left Mr. Peacock to recover his money if he could. This was not the first time the action had been before the Recorder. When brought the first time before the Court it was withdrawn by reason of the absence of a witness, so that accounted for the lateness with which the present jury had to deal with it. Now, if the plaintiff was entitled to his four guineas he was perfectly right in fighting this case for the principle of the thing, cost what it might ; in fact, now that the challenge was thrown down it would be cowardly if he did not take it up. Having a fixed scale of charges, and having brought his skill and knowledge to bear in the service of defendant, his client felt it would be an insult to himself, and derogatory to his profession, to accept any less. This was the principle on which his client came to the jury, and declined to accept the paltry guinea proffered by the defendant. The only matter in dispute was as to the amount charged, and he contended that it was clear, from the letters read, that Miss Harrison's friends knew there was a stipulated charge ; and if they did not know the precise amount in the first instance, it was clear they had accepted the charge made for the first visit, because Mrs. Harrison said her daughter was not to go again without she knew what the precise charge would be for a certain operation. But he should go further than this, and he would be able to show that Miss Stephens knew quite well that a guinea per hour was Mr. Peacock's charge, and that her pupils were in the habit of paying that charge.

Mr. Smith remarked that there was no proof of contract.

Mr. Sleigh said he was anxious to try the case on its merits, as between man and man, and if it was the policy of the other side to throw every possible technical objection in the way of his client, in order to prevent him obtaining his just demands, why, the jury would form their own opinion of such conduct. There were dentists and dentists, some who performed their duty with ability, and who were really and truly benefactors to their race; others there were who were quacks and charlatans, and had no more right to put an instrument into the mouth of a fellow-being than they had to do any other act which caused death through negligence or want of skill. There was, as he had regretted,

no college of dentists in England, and it was a very easy thing for a man to get a brass plate up and call himself a dentist in this country; it required by law no education for the work, no diploma, no qualification. It might be, and doubtless was, that some who called themselves dentists might be able to fill up a holed tooth in a very short time: might, in fact, be able to do twenty fillings up whilst another man more competent took all the time to do one, and do it properly and effectually. The learned counsel then minutely described the operation of filling up a tooth in the manner in which he said it was necessary it should be done, pointed out that the material used, gold leaf, was very expensive, and then intimated that in order to support the plaintiff in his declaration that the charge made was a fair and reasonable one, as well as the one understood to be his charge, he should call a number of witnesses whose testimony would be valuable, including one of the most successful and experienced London dentists of the present day, Dr. Coffin, of London.

Mr. Smith remarked that he questioned whether some of the evidence spoken of, would, when it came to be tendered, be admissible.

Mr. Sleigh contended that it would, and observed that Mr. Smith was now beginning to feel that it was getting a little too hot. (Laughter.) He (Mr. Sleigh) thought it came with ill grace from the defendant who was contesting the claim, to try and exclude this evidence as to the competency of the plaintiff and the fairness of his charge.

The Recorder hinted that the evidence would be perfectly proper, and he further observed that if the defendant knew what the charge was going to be he should rule that no evidence as to fairness was necessary.

Mr. Smith: Unless the work is badly done.

The Recorder: Certainly.

Mr. Sleigh: Oh, that is another card my friend is going to play. (Laughter.) Till to-day it has never been suggested that the work was not properly done. However, I am perfectly willing to take it upon that ground.

He proceeded to say that Mr. Peacock was a gentleman of education, he had taken every trouble to make himself fully acquainted with the details of his profession, he had a diploma from the Dental College of Pennsylvania, and having for some years practiced the profession with success in this country, he was entitled to be fairly remunerated for his skill and knowledge. Witnesses for the plaintiff were then called, and were examined by Mr. Haigh.

Miss Stephens was the first witness called. She said she kept a young ladies' school at Denmark House, Scarbro'. In October, 1873, Miss Mabel Harrison was at her school, and complained about her teeth. Witness told her she had better see a dentist, and she named Mr. Peacock, the plaintiff, advising her to write to her parents, asking them to give their assent to her seeing him. Mr. Peacock had usually attended her pupils, and she knew his fee to be a guinea an hour. It was well known amongst the pupils what that fee was, and witness told Miss Harrison that it would be a guinea an hour. Miss Harrison got a letter from her mother, and in consequence of that she went to Mr. Peacock. She went at about ten o'clock in the morning on the 13th of October, and returned a little after three o'clock. Previous to that Miss Harrison had suffered a good deal from her teeth, which were very decayed. After seeing Mr. Peacock she became quite well.

Mr. Charles James Peacock, the plaintiff, was then sworn. He said he was a graduate by examination of the Pennsylvania College of Dental Surgery, and his diploma was in court (produced). He studied in America expressly for the purpose of being a dentist. He had been in practice about nine years in Scarborough, and had a very considerable connection. Witness then gave evidence regarding the correspondence alluded to by Mr. Sleigh. The fee of one guinea an hour was a fair and reasonable charge, and one which was always paid to him by all his patients. His appointments were always made in advance, and he occasionally charged a guinea if an appointment was not kept. That was not charged in this instance to the defendant because of his daughter not coming a second time. Pupils from Miss Stephens' school had come to him before, and he had been paid a guinea an hour. Witness then spoke as to the operations he performed on Miss Harrison on the 13th of October. He prepared and filled with gold a molar tooth, and was about three hours at that. The other tooth had the pulp exposed and diseased, and he applied medicine to destroy the nerve, and then put in a temporary filling to keep the medicine in. That operation took about an hour and a half. To do justice to the patient he could not have occupied less time than four hours and a half for both. Compared with other dentists the fee was a fair and reasonable one. He knew the fees of London dentists. He had himself paid to Dr. Coffin £60 for nineteen fillings. Dr. Coffin told him that if he (plaintiff) had not been a professional man his fee would have been two guineas an hour.

By Mr. Smith : I am forty years of age. I was in a Manchester warehouse before studying to become a dentist, and I was at Phillips',

at Manchester. The diploma is dated 1861. I had two sessions at the college. A session is four months and a half.—Mr. Smith: How much did it cost you, may I ask?—Witness: Oh, about £200 altogether.—Mr. Smith: Not the diploma; what did the diploma cost you?—Witness: Oh, some nominal matter. I forget now. I believe about twenty dollars was the cost of the parchment.—Mr. Smith: And I suppose that would be paid in greenbacks?—Witness: No; they had not greenbacks in America then. (Loud laughter.) Further cross-examined by Mr. Smith, witness said that the tooth, if it was properly stopped, ought to do for years if the brush was liberally used. I have charged 10s. 6d. for filling a tooth, but that is some time since. I used to charge from 10s. 6d. to two guineas a tooth, but in July, 1871, I raised my fees to a guinea an hour.

Dr. Hickson, of Scarborough, said he knew the plaintiff as a dentist, and knew his fee to be one guinea an hour. Had many a time sent patients of his to the plaintiff since that was his fee. Witness had himself been under his treatment. He considered him—he might as well, he said, say it at once—one of the first dentists in Europe. He did not think the fee was unreasonable.

Dr. Coffin, of Cornwall Gardens, Queen's Gate, London, and a graduate of the Baltimore Dental College, and who said that for the last eighteen years he had practiced in London and the United Kingdom, did not think the charge made by the plaintiff, considering what he had done, was enough. Witness charged two guineas an hour. He had seen Mr. Peacock's work, a good deal of it, for thirteen years, and he thought very highly of it. There was complaint of every dentist's work, but he thought there was less complaint of Mr. Peacock than most people. He could speak in the highest praise of him. The process of filling a tooth should be a slow one when done properly. Of course witness had not seen the operation in question, but judging from what he had heard it was not too long.

Dr. Horne and Mr. Teale, surgeon, both of Scarborough, gave evidence of their high opinion of Mr. Peacock's ability as a dentist, both from personal experience, and the testimony of other patients. His charges were well known, and witnesses considered them moderate.

This concluded the case for the plaintiff.

Mr. Smith only addressed the jury very briefly for the defence. He began by depreciating the value of the plaintiff's diploma as one which could very easily and cheaply be got, and in regard to his mode of charging said that it would enable him to dawdle over his work as long

as he thought proper. He suggested that it had been done in this instance; but further than that, Miss Harrison would be called, and she would show that, even with that, the work was not done properly, for part of the stuffing had since come out. She had been subpœnaed by the plaintiff, but they had, singularly enough, not thought fit to call her. As to the evidence given by the doctors whom the plaintiff had called, he (Mr. Smith) did not wish to impugn their evidence, but they were all more or less interested in keeping up high fees. (Laughter.) He would only call Mr. Harrison, a dentist, of London and Hull, who would say that a guinea would be a reasonable charge, and after that the case would be in their hands.

Miss Mabel Harrison, the defendant's daughter, stated that she went at ten o'clock on the morning in question to see Mr. Peacock. She had to wait about half an hour, and whilst she remained there the plaintiff left twice for a quarter of an hour each time. She got home about half-past one or two. Last Christmas part of the stuffing came out.—To Mr. Sleigh: I have had four or five teeth performed on. Since I was at Mr. Peacock's I have been to Mr. Harrison's, at Hull, who comes from London.

Mr. R. H. Harrison (no relative of the defendant's) said he was a dentist in London and Hull.—Mr. Smith: How long have you been one?—I have been one ever since I was anything.

Mr. Sleigh: What a precocious infant you must have been. (Laughter.)

Witness (continued): I consider one guinea, or, at the most, two, an ample fee for a provincial dentist. Witness added, in answer to Mr. Smith, that he was a Licentiate in Dentistry of the Royal College of England—*not* of America. He had not examined the teeth in question of Miss Harrison's.

Mr. Sleigh: Don't you know that the Americans are the most proficient dentists in the world?—I knew that they claim to be.—Mr. Sleigh: Are they not recognized as such?—I should be very sorry to think so.

Mr. Sleigh: We don't want to know anything about your sorrow. I ask you whether they are not considered such?—I cannot tell what other medical men think.—Mr. Sleigh: Do you deny that in medical and scientific circles the Americans are considered the best dentists in the world?—I don't deny it, and I don't admit it.

The jury having been again addressed by Mr. Smith and Mr. Sleigh respectively, the learned Recorder summed up. He said there was no law in the case for him to explain to the jury. If they were satisfied

by the evidence—and it was certain from Miss Stephens' statement that the attention of the defendant's daughter was drawn specially to the fact that a guinea an hour was the usual charge—he thought the jury would properly affirm there was an understanding that that was the sum to be paid. The question was whether the jury thought the guinea paid into court was enough, and if they did not think it was enough, they must say how much more should be paid.

The jury retired, and after a short absence returned into Court with a verdict for the full amount. Mr. Sleigh applied for costs. The Recorder certified that it was a fit case to be brought into that Court, and he therefore should order that the costs should be paid, according to the usual scale of the Court.

From the Pharmacal Gazette.

THE MECHANICAL PRODUCTION OF OXYGEN GAS.

According to Graham, the proportion of oxygen in atmospheric air can be increased by means of dialysis from the normal 21 per cent. to that of 42 per cent. By means of an air pump atmospheric air is caused to traverse a kind of air cushion, whose inner wall is lined with flannel and a thin caoutchouc membrane. The oxygen passes through the membrane more rapidly than the nitrogen, and therefore the dialized gas becomes richer in oxygen. Graham assumes that the gas condenses on the surface of the membrane, becomes liquefied, and thus penetrates the membrane, being again vaporized as it reaches the other side.

The latest and most ingenious method, patented by Mallet, is founded, firstly, on the different solubilities of oxygen and nitrogen in water. One volume of water dissolves only 25·1000 nitrogen to 46·1000 oxygen. When these gases are mixed, as, for instance, in atmospheric air, their respective solubilities remain the same, but these must be multiplied by the tension of each gas in the mixture:

$$0.79 \times 0.025 = 0.0197 = 0.67$$
$$0.21 \times 0.046 = 0.0097 = 0.33$$

which is, in fact, the composition of atmospheric air dissolved in water, as determined by analysis. Secondly, it is based upon the fact that

water holding atmospheric air in solution, when coming in contact with oxygen, parts with the absorbed nitrogen, and takes the oxygen in its place. If, now, by means of a suitable apparatus, atmospheric air is forced into water, nitrogen and oxygen are dissolved in the proportion of 67 to 33. This solution, by continued pressure upon the unabsorbed air, will take still more oxygen from this and give nitrogen in exchange. Upon the removal of the unabsorbed gas, which is now rich in nitrogen, and the abatement of the pressure, the dissolved gas escapes from the water. By treating this six or eight times more in a similar manner, a gas containing 0.973 of oxygen can be obtained.

According to De Laire and Montmagnon, charcoal absorbs 985 times its volume of oxygen, and only 705 times its volume of nitrogen ; and as it seems that the oxygen, absorbed by freshly burnt sponge, passes into the ozone form by reason of the traces of iodides and bromides present, these agents may become highly useful pulverulent oxygen-bearing vehicles.

ELECTRIC LIGHT.

The London *Daily News* says : Some curious and useful information about the lights displayed from the clock-tower of the Houses of Parliament, is given in a report just made to the House of Commons. It appears that the two semi-lanterns which a spectator at Westminster sees 250 feet above him in the clock-tower, are in the hands of two rivals, one of whom employs gas, and the other electricity, as the source of illuminating power. The Wigham light has three burners, each composed of 108 jets, placed one above the other on the same axis. The electric light is produced by an electro-magnetic machine, worked by steam-power, the currents being conducted from the machine to the lantern along 1,700 feet of copper wires. The report is decidedly favorable to the electro-magnetic process. Thus Mr. Douglas states that the electric light has a superior intensity of 65 per cent. when one 108 jet burner is employed. So, again, as to cost : the electric method produced a saving of 162 per cent., measured in cost per candle per hour, when a 108 jet gas-burner is used, and of 133 per cent. when three burners are used.—*Scientific American.*

NOTES.

Dr. J. K. Morse, late of Detroit, Michigan, is reported among the lost, from the steamer Cadiz. Dr. Morse passed through New York recently, and announced his purpose of establishing a practice in Spain.

A Flexible Cable.

A dentist of New England has invented a flexible spring or cable into which soft rubber is placed and then vulcanized. This he claims has the power of checking vibratory motion, commonly called back-lash, when power is applied.

Verdict Against a Dentist.

The case of James *vs.* McCullom was tried May 13, in the Marine Court, Part I., before Judge Gross. The plaintiff complains that in September, 1872, the defendant, a dentist in this city, while engaged in filling his teeth, wounded him in three different parts of the mouth by letting his instrument slip, and that he was detained from business for over two months, the ill effects of the injury continuing, however, for a considerable time afterward, to some extent even to the present day. The damages claimed were $1,000. The family physician of the plaintiff described the course of treatment followed, giving it as his opinion that it was a genuine case of tetanus, caused by the injury complained of. The defendant admitted the cutting of the plaintiff once, but claimed it to have been only a slight scratch, from which no injury could result. His theory of the case was supported by a number of dental surgeons. The jury rendered a verdict in favor of the plaintiff for $450.—*N. Y. Times, May 14.*

This decision seems to us to be very unjust, and we find our opinion coincides with that of every practical dentist with whom we have conversed on the subject. We hear that further action is contemplated by Dr. A. McCullom, and hope he may be able to have the verdict set aside.

[Ed.

The fifth annual meeting of the New Jersey State Dental Society will be held at Long Branch, on Tuesday, the sixth day of July, 1875. All dentists are cordially invited to attend.

J. W. Scarborough, *Sec'y.*

American Dental Convention.

The twenty-first annual meeting of the American Dental Convention will be held at Long Branch, N. J., commencing on the second Tuesday in August. There is no permanent membership in this organization, and no initiation fee. Dues are collected only from those attending the meeting. All dentists are cordially invited to be present. Essays will be read, and interesting and instructive clinics given by prominent members of the profession.

Ambler Tees, *Rec. Sec'y.*

California State Dental Association

The sixth annual session of the California State Dental Association will be held in San Francisco, June 8th, at 10 A. M., and will continue four days.

The sessions heretofore have been productive both of pleasure and profit; and it is expected the approaching one will be characterized by as much unity of purpose and harmony of action as have been any of the preceding.

Pennsylvania State Dental Society.

The seventh annual session of the Pennsylvania State Dental Society will

be held at Cresson Springs, Pa., commencing Tuesday, July 13th, at 10 o'clock, A. M., and continuing three days.

Tickets can be obtained from almost any point, at regular excursion rates.

The Executive Committee have secured accommodations at three dollars per day, with the use of the Chapel as a place of meeting, and announce the following programme :

ESSAYS AND CLINICAL OPERATIONS.

C. N. PEIRCE, D.D.S., Philadelphia.—*The Lower Forms of Organic Life found within the Oral Cavity.*

E. T. DARBY, D.D.S., Philadelphia.—*The Electro-Magnetic Mallet.*

T. C. STELLWAGEN, M.D., D.D.S., Philadelphia.—*Dental Caries.*

JOHN MURRAY, D.D.S., Rochester, Pa.—*Dental Therapeutics.*

S. WELCHENS, D.D.S., Lancaster, Pa.—*Dental Education.*

G. W. KLUMP, D.D.S., Williamsport, Pa.—*Hygienic Laws.*

M. H. WEBB, D.D.S., Lancaster, Pa.—*Operative Dentistry.*

J. H. MCQUILLEN, M.D., D.D.S., Retiring President, Philadelphia.—*Address.*

E. T. DARBY, D.D.S., Philadelphia.—*Illustration of the Use of the Electro-Magnetic Mallet.*

G. B. MCDONALD, D.D.S., Conneautsville, Pa.—*Operation, Using the Automatic and Hand Mallets.*

S. H. GUILFORD, D.D.S., Philadelphia.—*Quick Wedging and Filling of the Incisor Teeth.*

F. HICKMAN, D.D.S., Reading, Pa.—*Illustration of the Use of the Matrix in the Filling of Teeth.*

Maryland Dental College.

The second annual Commencement of the Maryland Dental College was held at Masonic Hall, Baltimore, on the 3d of March, 1875.

The annual address was delivered by the Rev. Thos. Guard.

The number of matriculants was eleven. The degree of D.D.S. was conferred upon the following graduates by Dr. Cornelius T. Hurlbut, who represented the Board of Regents.

F. F. Drew.................Maryland.
Wm. H. Gingrick............ "
Wm. H. Law.............Connecticut.
F. W. Sheild.................Virginia.

Dental Society of the State of New York.

The seventh annual meeting of the Dental Society of the State of New York will be held at the Capitol, Albany, commencing Wednesday, June 30th next, at 10 o'clock, A. M., and continue in session three days.

The Essayists for the meeting are:

C. A. MARVIN.—*Cohesive Gold and Leaky Fillings.*

O. A. JARVIS.—*Dental Nutrition.*

FRANK ABBOTT.—*Indigestion: Its Causes and Effects.*

FRANK FRENCH.—*Theory and Practice.*

S. B. PALMER.—*Success or Failure in Dental Operations Chemically Considered.*

S. A. FREEMAN.—*To be announced.*

C. P. FITCH.—*To be announced.*

N. W. KINGSLEY.—*To be announced.*

W. H. WAITE.—*Dentistry in England.*

All members reading volunteer papers are requested to send the subject of their essay to Dr. O. E. Hill, 160 Clinton Street, Brooklyn, who is Chairman of the Business Committee.

The Essays read at the meeting will constitute the regular subjects for discussion.

It is suggested that members and delegates come with minds well stored with "Incidents of Office Practice," such as involve points of interest, that this department of the exercises, and the discussion of the essays, may be particularly interesting and instructive.

Any member wishing to exhibit any instrument or appliances, must present them first to the Business Committee, and, if possible, before the commencement of the first day's session.

The Secretaries of the District Societies are requested to forward their reports in time for the Secretary of the State Society to make up his report.

The State Censors will convene at the Capitol, Albany, on Tuesday, June 29th, to examine candidates.

Members are requested to stay at the Delavan House, as special accommodations for our comfort have been made with the proprietors by the Committee of Arrangements.

The meeting promises to be particularly interesting and instructive.

CHARLES BARNES, *Secretary.*

Meteorological.

By this time we may suppose the semi-annual change of weather consequent on the shifting of the area of greatest cold (from the continent to the sea for the summer, from sea to land for the winter), to have taken place. The approximate date for the summer alternation is May 3, and as evidence that it has taken place in any year, the following signs will be found helpful: 1. The sky begins to be often hazy. 2. The temperature never falls below 45°. 3. The temperature is lowest with SE winds, instead of, as during the preceding six months, with NW winds. 4. Rains usually begin with the wind at SW, and clear off with the wind at NE, instead of beginning with wind at SE, and clearing off at NW. 5. The regular breeze of clear weather is from ESE, instead of WNW. 6. Snow becomes impossible. 7. Rain comes from the lower clouds, and therefore much more rain falls from the same amount of cloud (so that the intervals of fair weather are longer); whereas, previously, rain fell from higher clouds, and was mostly reabsorbed in the lower strata before reaching the ground. 8. Electric clouds begin to precede storms, and are known by their compact globular form.—*The Nation.*

On Poisoning by Carbolic Acid.

Mr. F. Warren, resident surgeon at Steevens' Hospital, Dublin relates (*Irish Hospital Gazette*, January 1,) the case of a man who drank some solution of carbolic acid intended for disinfecting purposes, mistaking it for whiskey. Its action was most rapid; he immediately became insensible, falling down suddenly as if in a fit; on his recovery he said that he remembered nothing whatever after tasting the liquid. When brought to the hospital he was suffering also from extreme syncope. The stomach-pump was used, stimulant enemata administered, and after about seven hours he recovered his consciousness, and gradually rallied from the depression. An attack of acute gastritis followed. The urine passed the day after the accident was almost black, but was free from turpidity, and no trace of carbolic acid, blood, or albumen could be detected in it.—*Monthly Abstract of Medical Science, from the London Med. Record,* Feb. 17, 1875.

Absorption of Oxygen by Leaves.

MM. Deherain and Moisson have lately communicated to the Academie des Sciences of Paris a paper "On the Absorption of Oxygen and Emission of Carbonic Acid by Leaves kept in Darkness." They appear to prove that leaves kept in the dark absorb more oxygen than they emit carbonic acid, and that the internal combustion shown by the absorption of O and emission of CO_2 is the origin of at least a portion of the heat necessary for the elaboration of some of the new principles of the plant.

JOHNSTONS'

Dental Miscellany.

VOL. II.——*JULY, 1875.*——NO. 19.

ANKYLOSIS OF THE TEMPORO-MAXILLARY ARTICULATION OF LONG STANDING,

WITH FRACTURE OF THE RIGHT CONDYLE, ATROPHY OF THE DEPRESSORS MUSCLES, AND CONTRACTURE OF ELEVATOR MUSCLES OF THE INFERIOR MAXILLARY.*

By D. H. GOODWILLIE, M.D., D.D.S., of New York City.

The following interesting case was sent to me by Dr. L. A. Sayre, and as it so well illustrates the treatment of such cases, I embrace this opportunity to present it.

The history, as far as I am able to make out, is as follows: Mary C., of Tennessee, aged 10 years, in May 1870, five years ago, fell over the bannisters to the floor below, and when she was taken up, there was hemorrhage from the mouth and from a wound in the chin.

A dislocation of the inferior maxillary and a fracture of the right condyle was diagnosed by the surgeon that was called in the next morning. There was much swelling over the articulations, particularly on the fractured side. The swelling and discoloration extended down on the neck and up on the side of the head. After inflammation subsided, motion was not again re-established, and the jaws remained closed. In October of the following year the mouth was forced open at one operation more than an inch, but when the inflammation subsided, the jaws became closed as before, and have so remained until she came under treatment last October.

The appearance of the case when it came under my care was as follows:

*Read before the New York Medical Library and Journal Association, May 21st, 1875.

The superior jaw in front considerably overhung the lower jaw. There was a large prominence over the articulations, particularly on the side of the fracture. The meatus auditorius externus was considerably smaller on this side than on the other, which probably accounts for the dullness of hearing that she has. A scar is seen on the symphysis extending more to the left of it than to the right. The depressors of the lower jaw, viz.: the anterior belly of the digastric, mylo-hyoid and genio-hyoid, were very much atrophied by fatty degeneration, making her have the appearance of what is commonly called a double chin. The contraction of these muscles could only be excited by the whole strength of the primary current of electricity. She had apparently lost all volition over these muscles. There was a firm contracture of the elevators muscles of the jaw, particularly the masseter and temporal of the fractured side. The large amount of callus thrown out at the fracture has bound the muscles very much together. On looking into the cheeks the jaws are firmly closed on each other by the back teeth only touching, and that on the points of their cusps—they do not lock each other, as is normal.

The inferior maxillary appears to be well developed and the teeth are quite regular. All the deciduous teeth are gone, and the permanent ones that appear at her age in their place, with the exception of a bicuspid on the right side. All the opposing teeth of the upper jaw are present, with the exception of the right canine, the deciduous one still remaining, but loose. All the permanent teeth, with these exceptions, are present, from the first molars forwards. The position of these teeth can be seen in Fig. No. 1.

The superior and inferior front teeth do not touch on each other when the mouth closes, for the reason that, from the great force received on the chin at the fall, the condyles were forced upwards and backwards, so that the whole lower jaw is set back on the superior more than a quarter of an inch. This not only destroys the right articulation of the teeth, but the front ones are unable to close upon each other at all. Through this space she took her food, which was in liquid form, or very soft. As the blow on the symphysis was received a little to the left, the effect of the force was very great at the right joint, so that there was a fracture of the condyle, and the head of the condyle was forced in upon the meatus (Fig. 1.) and dislocated outwards. This lateral displacement was also the case on the left side, but it is not now so apparent. On passing my finger into the cheek of the fractured side, I found that the anterior fibres of the masseter muscle had been torn from their ori-

gin upon the malar bone, and now the anterior of the muscle was about on a line with the union of the malar with the zigoma. (Fig. I. A.) This muscle is very rigid, both from a structural change in the muscular fibres, and from the great amount of plastic material from the fracture binding them all together. Whether the anterior fibres of this masseter were torn from their attachment to the malar bone, at the time of the accident, or at the time when the mouth was forced open some three years ago, I am unable to say positively, but I am inclined to think they were fractured at the latter time, as then the muscular fibres having

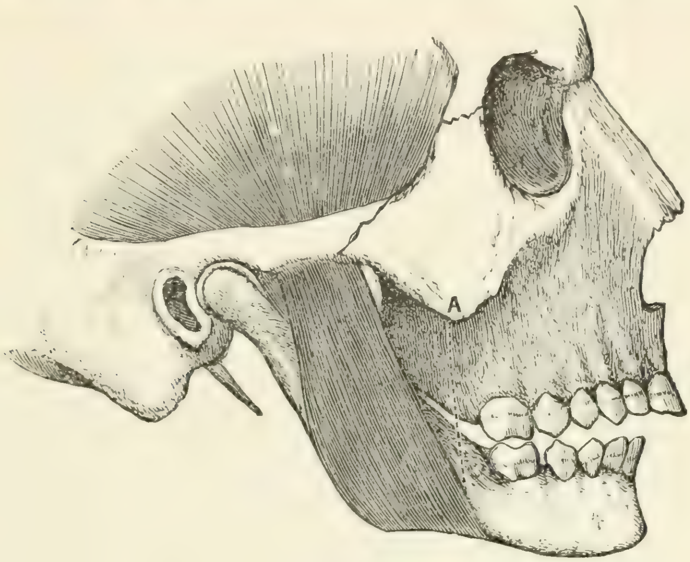


Fig. I.

lost to a great extent their contractibility would be more liable to break, than at the time of the accident. The left masseter was in a much better condition. In her endeavors to depress the lower jaw, the hyoid bone, instead of being made a fixed point from which the depressors muscles act, was raised, and the fixed point was at the sternum. The platysma myoides was brought into action and drew down the angles of the mouth, and the tongue was depressed by the action of the hyo-glossus and genio-hyo-glossus. These muscles are only the accessory depressors of the lower jaw, and in action, raise the hyoid bone, whereas, if the depressors act, the hyoid bone remains a fixed point.

The condition of an articulation or muscle may be known by means of auscultation. In a healthy articulation little or no friction sounds should be heard, but when deposits are present, or a lack of synovia in the joint, the friction sounds can be distinctly heard during motion. These sounds will be greater or less, according to the amount of disease,

and will disappear as health to the joint is restored. A muscle in health *has* friction sounds, and these will vary according to the condition of the muscle, and the part auscultated. A muscle in which there has been structural change will, of necessity, show a defect in the friction sounds, according to the amount of change. As the function of the muscle is restored, so will the friction sounds return.

It will be seen by the above history and diagnosis that I had a case of unusual interest, inasmuch as I had to deal with ankylosed joints, atrophied depressors, and contractured elevator muscles. The treatment was a problem that required to be *worked out.* What should be done with these atrophied muscles, when one of the most important part of treatment, that of motion, was entirely gone, and when in order to get motion it was necessary to break up the ankylosis, and reclaim the contractured elevators. In studying this we must take into account the pathological condition of the parts involved, and act accordingly by persevering in a treatment that will restore them to a physiological condition. The certain properties that these muscles possess in their normal condition, such as irritability, tenacity, elasticity, and extensibility, when lost, can only be restored by a gradual process.

The abnormal condition of these muscles was not brought about in days or weeks, but in months and years, and is it reasonable to expect that they can at *once* be restored to their function? We may break a rigid, inelastic muscular fibre, or even stretch it to a certain degree, but without the power of volition in such a muscle what does it profit? Volition may be lost in a muscle that has little or no pathological change in it; how much worse, then, the condition when volition is lost by abnormal structural changes?

It is my experience in all cases of fibrous ankylosis of this articulation, of long standing, that the pathological condition of the muscles is a point on which turns success or failure in the treatment of these cases.

Without *good muscular action* following the breaking up of an ankylosis you need not look for success. I have never seen it. The health of any organ depends on its perfect function. The vital changes that must take place in the muscles, joints, synovial membrane, &c., can only be brought about by an untiring perseverance in a proper treatment. The age, temperament, recuperative powers of your patient, together with the length of time, and amount of injury done, and willingness on the part of your patient to undergo the operation, will determine the time to produce a cure.

Treatment.—By proper treatment after this accident the dislocated

and fractured inferior maxillary could have been replaced, and motion restored again. Now it has become a matter of tremendous importance to the patient, and an experience in treatment commensurate with the severe condition of the case.

I first saw this patient on the 19th of October last. In order to make out a correct diagnosis I put the patient under the full anæsthetic effect of nitrous oxide. I could detect the slightest motion in the joint, and the elevator muscles very rigid, particularly on the fractured side. I then decided to make gradual extension every day, but not to the point of getting up any amount of inflammation, so that every day some little advance could be made.

In order to relieve my young patient of some amount of suffering for the long time it would require to treat the case, I determined to administer nitrous oxide every other day to begin with, and manipulate the muscles and joint under its effect. On the alternate days to go as far as the sensibilities of my patient would allow. But during the latter part of the treatment, when the depressors had become developed, the anæsthetic was administered nearly every day. Electricity was used daily, and a portion of each visit I used my fingers as electrodes, in order that I might knead, rub, and roll the muscles. At first, however, the atrophied muscles took a stronger current than I could bear in my hands, but as they became developed the strength of the current gradually became less.

It now became necessary to have an apparatus for the gradual extension of the elevators, and the exercise so much needed in the development of the atrophied depressor muscles, and, at the same time, to break up the ankylosis. Such an apparatus as has met this requirement will be seen in the fig. No. 2.

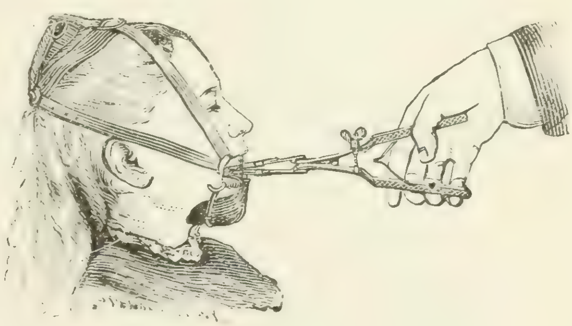


Fig. 2.

It was very necessary, having commenced a long treatment of this case, to prevent any delays that might occur to stop treatment.

One of the greatest sources of interruption is periodontitis, from the great amount of force used on the teeth. To prevent this I protect them with an interdental splint of hard rubber. These, at the first, are necessarily very small, and confined to the front teeth ; but as the case progresses, longer and more perfect ones are made. In this case, the rubber splints were enclosed in metal splints made of German silver, as this metal is tough and unyielding. These splints were made fast to the teeth by straps that pass from strong wire arms at the sides to a skull cap, and in the lower one was strapped to a pad on the chin. This pad was also attached to the lower splint by means of a ratchet and spring. From the front of each splint an arm extends out 1¼ inches, and ¾ of an inch broad, and to those is clasped the oral speculum when in use (See fig. No. 3.) The inclined planes of the speculum pass in between these arms, and they are held by clasps. The inclined planes are attached by moveable joints to a distending forceps, so that when the handles are approximate the inclined planes are separated at their attached ends. Each handle is made in two sections, and the spring that separates the handles is enclosed between them to protect them from injury. In forcing the speculum between the splint, the instrument is grasped by one of the handles, and when in place, both handles are approximated. If more force is desired, or the mouth is to be held open at any point, the screw at the handle may be used.

In stretching the masseter and temporal muscles I use an oral speculum that I devised some years ago, (fig. No. 3,) as it has a great deal of power. It consists of a shaft, to the flat end of which is attached two wings, or inclining planes, upon which the teeth rest. The other end of the shaft has a thread cut on it, and a screw ; this passes through a handle, one of which is wedge shaped. By turning the screw on the other side of the handle the inclined planes diverge or converge.

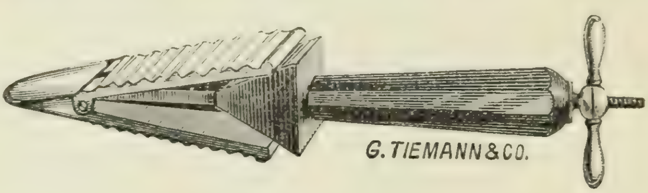


FIG. 3.

Figure 4 represents a spiral spring speculum for the patient to exercise on by placing it between the teeth and biting upon it. Longer springs are used as the mouth gets opened. These instruments were made by Geo. Tiemann & Co.

During the first few weeks of treatment the mouth was opened a little space, and new splints made.

The following is a note of the treatment from time to time.

Dec. 16th.—She begins to have a slight control of the atrophied muscles; can put the tongue out of the mouth a short distance.

Dec. 18.—She put a teaspoon into her mouth the first time since she received the accident.

Jan. 1st, 1875.—Mouth now opened ⅜ of an inch with good motion, but not altogether by the action of the direct depressors. Patient complains of soreness over the masseter and temporal muscles.

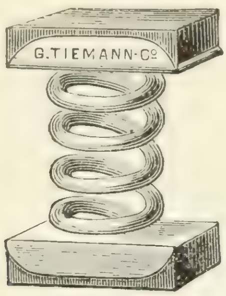


Fig. 4.

Jan. 11th.—Yesterday used considerable force under the anæsthetic. To-day, complains of pain in right joint and muscles.

Jan. 15th.—Patient says her jaw feels loose, by which she means that she has better control of it. At this time the atrophied depressors show some increased development, but she has very little volition in them, and so she would use the accessory depressors to open her mouth. In order to paralyze these muscles and bring the direct depressors into action, I directed her, on all occasions at exercise, to keep the tip of the tongue and the lower lip up against the lower incisor teeth. By this means the hyoid bone was made a fixed point from which the direct depressors act.

Feb. 15th.—Volition returning in the atrophied depressors. Good, natural motion ½ inch, and after exercise with instrument ⅝ inch.

March 16th.—Good natural motion ⅝ inch; strength of electrical current much less. It decreases as the atrophied muscles develop strength. I discovered, on looking into the mouth, that there was some loss of power in muscles of the tongue, particularly that the palato-glossus. Patient speaks thick, as though the tongue was too large. Applied electrical current.

April 6th.—Patient complains of periodontitis from the force used

yesterday. She caught cold by exposure yesterday. This passed off in a day or two without interrupting the treatment.

April 19th.—As there was great rigidity in the masseter of the fractured side, I performed myotomy under nitrous oxide in the following manner: I passed my left index finger inside, and pulled the cheek out, the end of my finger resting on the anterior fibres of the superficial portion a little below the middle. I pierced the sheath of the muscle, and passed the blade of the myotomy knife up between the deep and superficial portions of the muscle. My object in this was to free, if possible, the two portions of the muscle, by dividing interstitial tissue that might bind them. It was not my intention to cut any fibres of the muscle.

April 22d.—Swelling and soreness gone from the masseter. The mouth does not open any wider by this operation, but the motion is considerably improved.

May 5th.—Performed myotomy again in the same manner as before, and followed by the diligent use of the spiral spring speculum have improved both motion and extension.

May 15th.—I have now good motion, $\frac{7}{8}$ on an inch measurement taken between the points of the superior and inferior incisors. Tongue can now be put well out of the mouth, and she speaks better.

June 15th.—The mouth now open one inch with good motion. Myotomy was again performed, separating the posterior fibres of the masseter. The result was as favorable as on previous operations. Speech much improved. Extracted decayed first left inferior permanent molar.

It is only now a matter of a little farther time in continuing the treatment to get the mouth opened sufficiently wide. After I dismiss her, I will advise the frequent use of the spiral spring speculum and electricity for some time, until action of the muscle is well established.

During this long treatment I have taken care not to overdo, so that every day the treatment was carried on with scarcely a day's interruption. I have seen the patient every week-day, and hourly exercise has been kept up during the day, at home: first, by using wedges of pure india-rubber, and after the mouth was somewhat open, by the spiral spring speculum. It is only by this persevering treatment that any success may be expected. The age of this patient may be in her favor as regards the vital changes, but in other respects it was not favorable. It is so difficult to make children take the proper exercise, even to the point of considerable suffering, as is required. They must be under constant

observation. This is not so necessary in an intelligent adult, as then your directions can be carried out by the patient, the person most interested.

I have administered the nitrous oxide to this patient up to this time 120 times, given more than 600 gallons of gas. I am at present giving it every day. There is no apparent harm, and she is in better bodily condition now than when she came under treatment. Her weight of body has increased. This anæsthetic seems almost indispensable in the treatment of these cases.

Case 2.—Ankylosis and contracted elevator muscles.

The following case was one of two and a half years' standing before I saw it. I give it as showing the result of treatment.

In March, 1872, Miss M. K., Brooklyn, aged 21 years, came to consult me concerning her closed mouth. Had some time previous an attack of acute tonsilitis, of both sides. The inflammation extended to the temporo maxillary articulation. The result was closure of the mouth. Masseters very rigid. Patient had also suffered from several ulcerated upper molar teeth, which also had something to do with this condition. With her past experience, and a dread that it would last her life-time, she was now a most willing patient. Treatment was commenced, and carried on for six months, and she was discharged, entirely well. She sent me word a short time ago that she had the free and full use of her jaws now, after an elapse of more than three years.

A MERCURIAL MOMENT.

By W. Geo. Beers, L.D.S., Montreal.

Common sense, as well as chemistry, though that is tautological, seems likely at last to dispose of the hobgoblin style of denunciation of Amalgam used by some superficial investigators to frighten simple men and silly women. Instead of the simple sneer, born of bigotry and bred by conceit, which some of the would-be gods of dentistry on this continent seem to think more than equivalent to candid examination and fearless defense, we have lately had dispassionate and scientific experiment, and conclusions which are better late than never. The Amalgam cry has been a peg upon which some very inferior operators have hung their fortune. It looked well to extol gold in every case,

even if one hadn't the ability to use it. "Anybody can use Amalgam. I don't use it." "Not everybody can use gold. I use gold." True, scores of teeth attempted to be filled with gold became reproachful stumps, but better the forceps than Amalgam for these brilliant practitioners.

As far as Canada is concerned, I can safely venture to say that the gold fillings of the few anti-amalgamites, when they stand at all, won't stand criticism.

This is a subject, however, to evoke more pity than preaching; and were it not for the dangerous use they make of the crooked knowledge they possess, in terrifying people who are constitutionally predisposed to terror, whether on the subject of Amalgam or vaccine, the opinions they hold would only serve to immortalize their own lack of scientific and philosophical acumen.

An ardent plagiarist of Dr. Parmly's old writings on Amalgam has been for some years supplying our newspapers with paragraphs *à la Dr. Payne*, vilifying Amalgam as more mischievous than Asiatic cholera, small-pox, and all the other ills to which flesh and bone are heir. The bait took. Puzzled pathologists, unable to diagnose diseases, pounced upon Amalgam. Unfortunately for them, in some cases the supposed Amalgam turned out to be tin. Delicate damsels, once consigned to Colorado, to California, or "anywhere out of the world" of the perplexed practitioner, were gravely told to open their mouths, shut their eyes, and learn what the god Mercury had been doing through the medium of the plugged cavities in their grinders. It was all the same to these profound diagnosticians as to whether or not the patient had been previously mercurialized, or was then under treatment. Amalgam has broad shoulders. *Anathema!*

Among the amusing questions asked me, consequent upon this contagious cry, the following letter speaks for itself. The manner of the reply may serve as a model for confreres afflicted by such ridiculous correspondents, whose education and position in society ought, at least, to secure them more common sense.

"DEAR SIR:—Having recently had several teeth filled with the filling recommended for frail back teeth by yourself, and used by Dr. —— here, I now address you to know *if there is anything poisonous or deleterious in its composition*, likely either to injure the teeth or the constitution. An answer will oblige Yours truly, ——.

MONTREAL, ——.

MY DEAR MADAM:—In reply to your extraordinary letter I beg to

express my surprise that you are not aware of the fact that the dental profession devotes itself to the annihilation of the human race, in the humble way of introducing "poisons" into the teeth.

Believing that the world is not large enough for its population, and that emigration to this continent is attaining a state of fanaticism equal to the Crusades, we are specially leagued, and in Canada licensed by act of Parliament, to "injure the teeth and constitutions" of those who become our patients, and in this way assist the various providential means by which our mortality returns are increased. In a thoroughly philanthropic and scientific spirit we are thus using "poisons" and other "deleterious" substances, such as have been very properly supplied to you, and which, I trust, may soon afford you a happy flight to those mansions in the skies where wicked teeth cease from troubling, and patient and dentist are at rest. Yet it is provoking to find, that in spite of our consistent poisoning, *some* of our patients do not die. We are, however, considering the propriety of introducing the guillotine, the thumb-screw, rack, etc., as we find "poison" to be prolonged, expensive, uncertain, and somewhat disfiguring to the complexion of the deceased.

We kill according to the fee received. Cheap dentistry is necessarily prolonged poisoning, owing to the adulteration. I cannot tell whether or nor Dr. —— confines himself to the purest poisons. He may possibly be producing in your case a *lingering* death. Were I you, I'd ask him to make it "short and sweet." I always advise expedition. As for me, I prefer strychnine in my filling—it is quick; though the guillotine will doubtless supersede it for rapidity of destruction. A guillotine is rather unsightly, but it effectually cures all trouble in the teeth, by going to the root of matters, and removing *the crown.* I might say we now have the germ of a gallows in a Suspension Dental Engine, designed from an instrument found in the Spanish Inquisition.

Our success as a profession may be judged from the fact, that there were over two hundred deaths in Montreal last week, though we have only thirty dentists, and six of these are starving. The prospects are cheering to men who devote themselves to the extermination of the population.

With profound respect for your very intelligent appreciation of the objects of the profession, and much esteem for your high opinion of my personal faith in *poison* as a filling for a tooth, believe me,

Respectfully Yours, W. G. B.

P. S. I have just learned that a lady for whom I filled two cavities with Amalgam two years ago, has been drowned. You know that the

god Mercury was the messenger of Jupiter, and had the office of conducting the soul to the under-world. It was Mercury who turned Hersa, the daughter of Cecrops, into a black stone, when she snubbed him on popping the question. Many common Amalgam fillings turn black. It may be the beginning of a similar fate. There is something, after all, in the mythology of the Greeks. May we both live to become wiser.

DENTISTRY IN EUROPE.

The following extracts from private letters received from two eminent practitioners of England are kindly sent us by a New England friend. They are interesting as showing the state of feeling existing, as regards dentistry, and the difficulties that attend building up a practice there. We do not hear a different opinion from others from Europe, with whom we have conversed on the same subject. Almost uniformly, the returned practitioner assures us that he could have built up at home a practice equal to the one he has left, and have done it in the same time, and in the midst of home, friends and comforts.

He has a practice established—the growth of years—which he cannot afford to leave, and which keeps him and his family from associations which he now values more than money. In many cases he would gladly sell his practice if he could find a purchaser, and start afresh at home. We long since concluded that a full knowledge of the real probabilities of success, and of the disadvantages attendant on the establishment of a dental practice abroad, would very generally lead the intelligent young American dentist of ability to remain in the United States to build up his business, and "to do Europe" afterwards, as a traveler.

But here are the extracts :

"You are evidently raised and educated in the United States. If you came over here you would find people very different from those you are accustomed to, as regards their dealings with either surgeons or dentists. I may say that my opinion is unbiased, because I do not want half, or a quarter the practice I could get in dental work ; but if I were to follow out the American system—*i. e.* to demand that they should put themselves under my control and judgment entirely, as I have seen the Americans do, and as I regularly do myself *with Americans*, I might shut up entirely. A practice managed in this way can only be successful in Eng-

land in a few large cities, where there is a very large class of patients to select from; when you have to do with a patient whose ancestors came over with William the Conqueror, he or she generally contrives to let you know it. If they found your ancestors here when they did come it does not matter, as you have disgraced them by going into trade—*i. e.*, you have to earn your living. Your professional men are your educated classes and your aristocracy—ours are not of necessity either one or the other, as there is a very large class here who have nothing to do except to consider themselves swells.

Nine out of ten patients will come and tell you what they want done, and will make a specific contract that what they want done shall be done without pain. If you remonstrate and explain that the thing cannot be done properly as they want, the rule is that they go away and consider about it. A year or two after they may perhaps turn up again, if they have not gone to any one else in the meantime, and begin the same tale with the same conclusion. I have now several cases which have been hanging over this way for *years*. The people will not go elsewhere, and will have the thing done their own way, and they wait, expecting I shall give in. If I wanted to make a living I should have to do so. I lose at least half my patients by this—they will not attempt to reason—but simply say I want this done in my own way, right or wrong. It is the same with the surgeons, and they must either give in or fail in the majority of cases.

It takes in England, on an average, about four years in a small town, and eight to ten years in a large one, before a dentist or surgeon is doing a fair amount of work. If he receives £50 his first year he is doing well, and if he pays his way the third year he has no cause to complain. If he does first rate work in his own way he may be taken as an authority, but the people do not go to him, and he proves a commercial failure, more especially if he keeps up to the times and tries new things. About eighteen months after the gas was commonly used in America, Dr. Taylor started using it in Warrington, and he succeeded in getting three patients to take it in the first year. We are awfully slow and respectable. A dentist here should have a grey or bald head, gold specs, a tail-coat, diamond studs, and a crest on his note paper, if he is to be a success; his work does not matter much. There are some few exceptions to this, but they are rare, and are generally old established connections which have descended from one generation to another. Very few indeed do any good except the name and house have been known for a generation.

Now as regards fees. The leading operator in one of our largest cities next to London, until very recently, charged 5s. for amalgam plugs, and 7s. 6d. for gold, occasionally getting 10s. 6d. He recently doubled his fees and dropped half his practice. If he had not been independent of the whole affair he would have made a dangerous experiment, and would probably have failed.

New things do not take here at all. If I were to get a Morrison engine I should waste more time than I should save, in having to explain it to everybody. They would go "smelling" round it like a cat at a mousehole, and would be afraid to let me use it because my grandfather could manage without.

Dentists have not a good time of it in this country by any means—no more have surgeons for that matter—and I should be sorry to have to do what nine dentists out of ten are compelled to do for a living. You get people coming with a mouth full of evil-smelling roots, loose teeth etc., and they want a set of teeth made. The first thing is a general clearance, but no, they have had the loose teeth and roots in so long that they must stop as they are, and after endless talking the affair is left over "for the present." A few years after, the same body turns up with a set made by some one else, which wants repair or alteration, from changes caused by the teeth and roots left in—mouth in a worse state than ever—and so on *ad infinitum*. One lady brought her child to have a temporary tooth extracted. I refused, and gave my reasons. She went straight to Liverpool, tried two dentists there with the same success, came back and got it extracted by a druggist here. Now the permanent teeth are crooked, and I shall have to make a regulating plate. Few English dentists will acknowledge this state of things, many deny it, and amongst those who do I know some who, within my own experience, have done repeatedly the things they condemn; they *must* do it if they are to live by their work. If I get an American and tell him what I want to do, he simply says "Very well, do the best you can," and I can go ahead without any bother. The English, on the contrary, will often want to get their specs out to squint at every instrument you use, and have a strong tendency to put up their hands and fetch all your "fixtures" away, to make a remark that they can *feel* what you are doing, and it requires strong language to keep them down. It is much the same in some parts of France and Germany, and also in Italy, and it is a perpetual up-hill fight, in which the dentist often degenerates and goes to the wall. Yours truly, ———."

"London, May 1st, 1875.

I shall of course be very pleased to see any patients from America

whom my friends over there may be kind enough to send to me. It will be a treat to see now and then a patient who can appreciate any pains which may be taken with his case. The majority of patients in this country seem to appreciate their dentist the more, the less he does for them. I really think they go to their dentist like so many go to church, more as a duty, or because others do, than from the belief that they will derive benefit therefrom.

P. S.—Since writing the enclosed I had a curious case. A powerfully built gentleman about twenty-six years old, and about six feet two inches high, came to have a tooth filled. It was not sensitive at all, and not much decayed; I had not been at work two minutes before he fainted. I got him round and started again, and he did the same thing. As this was getting monotonous. I went on and finished the excavating whilst he was insensible, and left him for a time after I had got him right. On attempting to plug the tooth he fainted again, the perspiration running in streams from his face and hands, and I finished the filling before he came to consciousness. He did not know he had been insensible, but simply said he felt queer; the curious part of the thing was that I gave him no pain at all. He could not account for the fainting in any way, as he looked, and said he was, in perfect health. There is in this country a mortal terror of dentists, and nearly everything is put off till the last possible minute, spite of anything one can say to the contrary."

NEW YORK ODONTOLOGICAL SOCIETY.

The Society met at the residence of Drs. Francis and Carr, Tuesday evening, May 18th, 1875, President A. L. Northrop in the chair.

Letters were read from several gentlemen expressing their regret at being unable to attend the meeting.

Dr. W. H. Dwinelle: It has been my custom in cases of regulating, not only to take an impression of the interior of the mouth, but also of the exterior; and it has been interesting to me to make a comparison of the models of the parts, externally and internally, at the commencement and at the end of the operation. I have quite a number of such specimens, of which I have brought two to-night. (The Doctor here produced two plaster models, the one representing the frequent V shaped irregularity, and the other representing the same case, after regulation, together with the plaster casts of the face from the base of

the nose to the chin.) I may say in passing, in corroboration of statements made by Dr. Kingsley, recently, that this case was virtually regulated in 60 days. That is to say, I succeeded in bringing the arch to the condition in which it now is, in that time, though for many months it was necessary to wear a retaining plate.

Again, gentlemen, by way of incidents of office practice. Thousands of years ago the Chinese discovered great potency in the essential oils, especially the oil of peppermint, for neuralgic affections. Several years ago, a gentleman handed me a little package that he had brought from China, saying it was a sovereign remedy for all forms of neuralgia. I tried it and found it a potent remedy for facial neuralgia: and that an application of it over the gums of inflamed and neuralgic affected teeth, was attended with very gratifying results. Wherever we wish to introduce counter irritation, these oils are of great value. I don't know but I should apologize for the presentation of so simple a remedy, but our pharmacopea is limited, and any new contribution should certainly be welcomed.

In regard to amalgam fillings, I have sometimes built entire crowns of it. In some cases, however, the weight is found objectionable, a large crown of amalgam having a very perceptible weight. I have recently avoided this to a great extent, by adjusting a core corresponding to a diminished crown, arranging it in place, and building around it; after the amalgam had become consolidated, cutting into and digging out the core, and supplying a thin cap to cover the orifice. This is seemingly a great advantage.

A MEMBER: Wouldn't it be as well to use a light material for the core, and leave it in?

DR. DWINELLE: I suppose it would, but if one goes to the trouble of such an operation, he desires to have the weight materially lessened. When you can make a very thin hollow stopping by digging out this core, and have it at the same time light and practicable, I think it best to do so.

DR. J. W. CLOWES: For myself, I never have observed that amalgam built up solid was any too heavy. I have never heard any complaint, and I cannot conceive how it can be so. Even in case of solid gold, I have never heard any objection to the weight. My practice has been, and I have found it quite satisfactory, instead of having a core, to make an under cut, and place one or two screws in the tooth. If there be two roots, put in two. The screws may be of iron, platinum, or of gold. I have frequently used an iron screw. If we depend en-

tirely upon the under cut in the root, the fastening would weaken the root too much ; but if we depend more upon the centre screw, we do not have to take away so much of the strength of the root, and it makes a fine piece of work. Sometimes I use a little cylinder of the same shape as the crown, but generally I can build up my amalgam crown perfectly well with this little stay.

Dr. A. H. Brockway : I have found it advantageous in my practice to use the mallet in the insertion of amalgam fillings. It consolidates the amalgam, and throws off the mercury. I frequently use punk under the instrument in malleting amalgam.

Dr. O. E. Hill : If the object of malleting is to get rid of the excess of mercury, I would inquire if you could not do that even more effectually by the use of an instrument slightly warm. You will get rid of more quicksilver by the use of a warm instrument than by any other method. Besides, cavities where we can use a great deal of force—malleting force—are not the places to which amalgam fillings are adapted. If you intend putting in a large amalgam filling, an excellent method is to take a piece of tin that will occupy one half the space of the cavity—a solid tin plug—insert that and fill around it. Leave the tin in, and the excess of quicksilver that may be there will be absorbed by the tin. That I have found to produce an excellent filling.

Dr. Brockway : I have tried both methods, and I decidedly prefer malleting ; and I think it can be demonstrated that more mercury can be got rid of by malleting than in any other way, and that the results are decidedly better.

Dr. W. A. Bronson : It seems to me that malleting produces a filling much superior to the ordinary method of introducing amalgam. Gentlemen will be surprised at the effect the light taps of the mallet produce upon an amalgam filling, and with the exception of Fletcher's, dressing off an amalgam surface with tin foil, rubbing it down and burnishing it off, leaves a very beautiful finish.

Dr. Brockway : I have adopted a hint dropped by Dr. Bogue, of using crystal gold on surfaces, in preference to tin. It takes up the mercury more readily, and leaves a harder surface.

Dr. Dwinelle : Dr. Clowes remarks that he does not see any objection that can arise from heavy crowns. If he will reflect a moment, instances must occur to him, wherein he has seen manifest trouble from solid masses of gold or amalgam in very frail teeth. A principle of mechanics comes in there, namely, that where a heavy material is supported by, or in contact with a frail material, that the weaker must in-

evitably be, to a greater or less degree, overcome by the stronger. This principle is so thoroughly recognized that oftentimes some of our most promising inventions have been obliged to be abandoned, because they involved a constant succession of arrested momentum. A piece of mechanism would start, and suddenly come to a stop. This, continually repeated, resulted in knocking the mechanism itself in pieces.

Dr. C. P. Fitch : I do not question the philosophy of the last speaker in reference to that principle if applied to mechanism, but I question whether it applies to the human teeth. I think the movement of the human jaw, in the antagonism of the teeth, is not such as to produce the result he mentions, unless the filling antagonizes with a frail tooth. Almost all the teeth we fill with the cheaper materials are in an advanced state of disintegration, and in such cases the weight is doubtless objectionable. But I never had patients complain of the weight of fillings as unpleasant. I can readily see that the same objections might be urged against gold as against amalgam, if it has merely reference to the weight of the filling. I am in the habit of using amalgam, and I suppose there is a happy medium in getting the best result with it. I take it that if you press too much mercury out of it, you prevent that proper crystallization which will give you the best result. It is a possible thing to press so much of the mercury out as to make the amalgam weak and friable. The great desideratum in practice is to know how much mercury to leave in our plugs, and not be so careful to get all the mercury out. For the purpose of extracting the mercury I do not think malleting is superior to pressure. It might, perhaps, bring a little more to the surface, but that has not been my purpose, and I have always thought it best to leave a certain amount of mercury in, in order to get the best results.

Dr. Hill : I think this idea of eliminating the mercury from amalgam is sometimes carried too far. My experience agrees with that of Dr. Fitch, and I think if you get rid of too much quicksilver, your filling is not good. It will not wear. There may, however, be a difference in amalgams in this respect. I have squeezed the mercury out with pliers, and after letting the amalgam lay for a day or two, found, upon handling it, that it would become a powder.

A Member : What amalgam was that?

Dr. Hill : Holmes' amalgam.

Dr. Brockway : In my experience I have met with none of the bad results mentioned. On the contrary, I have found the fillings upon which I have used the mallet remarkably hard and firm. I conceive

there is an advantage in the use of the mallet other than that of expressing all the mercury. I don't pretend nor desire by its use to remove all the mercury possible, because if that were my desire I could effect more by the additional use of gold upon the surface. I use the mallet for condensing the material, and removing the *excess* of mercury merely. At the last finish I usually touch the surface of the plug lightly with crystal gold, which absorbs the mercury immediately upon the surface. Then with a burnisher I dress down and burnish the plug.

Dr. Clowes : I have recently noticed, in the enumeration of improvements in amalgam, that platinum is spoken of as being an important ingredient for preventing discoloration of the filling. Some years ago I tested the combination. I found that there was no affinity between quicksilver and platinum, and that if enough platinum is put in to prevent tarnishing, that the filling has a tendency to crumble. Therefore I do not think that platinum increases the utility of amalgam.

Dr. Coy (Baltimore) : I have used amalgam for a number of years, and never except as a plastic filling. That, I think, is its proper use, and when you have expressed all the mercury possible, that it it is no longer a plastic filling. I filled teeth over 20 years ago with this material, not attempting to express all the mercury, and those fillings are good to-day. That shows that amalgam, as I used it, can be made a good, durable filling.

Dr. Brockway : I see I am not exactly understood. I do not use the mallet for the purpose of expressing the mercury, but for the purpose of condensing the filling. I do use amalgam as a plastic filling in those cases where it would be, if not impossible, so extremely difficult to use gold that I should not feel justified in making the attempt. I do not, before using mercury, express all the mercury I can with the pliers, but merely so much as I can express with my fingers. That leaves it in such a state of plasticity that it can be readily introduced into any cavity. I then apply the mallet, and the consequence is the condensation of the filling, and the expression of the free mercury there.

Dr. N. W. Kingsley : I did not intend to say a word, but the old, repetitious tone of discussion here to-night leads me to call your attention to a few things. The profession is devoting a great deal of time, intellect, and expense, to a complete and thorough investigation in this direction. But I would ask, what is the use of their doing that, if we are not going to profit by the results ? Now at the meeting of the Society last December, we had reports of a long series of experiments made by different gentlemen in whom we have the utmost confidence

as to their ability to make correct experiments, and we ought to abide by the results. I have not read those papers since their publication, but my impression is that the conclusion arrived at in them was that all attempts to express mercury out of amalgam, after it is mixed, is wrong. And since that time, I have been governed by that authority in my practice. I believe those gentlemen knew what they were about, and that they made their experiments so as to secure a more thorough and reliable test than can be done in any way, in the mouth. What did they say? "Instead of mixing your filings, or whatever form it is in, with your mercury, and squeezing it until you have got it to that happy medium, work the filings into the mercury until it is as stiff as it can be used in a plastic state." Those experiments show that a certain amount of mercury is necessary in the filling. We are inclined, I think, to theorize without much knowledge. If we looked upon the gentleman when he was operating, and saw him perform the operation, we would perhaps form a different idea from that conveyed by his verbal description of it. Nevertheless, to my mind the use of a mallet in putting in an amalgam filling is unnecessary and unadvisable. Where I have used amalgam, it has been in cases where I have wanted a filling of a plastic nature, so that I could build up, as an artist in clay builds up, and I would just as soon think of taking a mallet to model a clay image, as I would an amalgam filling.

Dr. Clowes: I have been induced to write this brief paper, in order to clearly and definitely make known my position in regard to certain subjects with which I have been associated for a number of years. I have discovered that a person may make a statement in the most explicit language, and that it may be entirely misinterpreted, or perhaps a brother in the profession would put entirely different words into my mouth from those I really expressed. I refer particularly to an instance where, in reference to *contact*, I was said to declare that "contact is always a cause of decay." I never said such a thing, and yet that language has been repeatedly ascribed to me by gentlemen who certainly know the importance of correct statement. In order that the mistake may not be continued, I have written as follows:

Facts are my theme. While about my daily labor, when I come here, wherever I may be, I glory in them, and aspire, by exactness and precision in word and work, to give them emphatic expression. When, many years ago, I called the Dental File "blessed," and said that "skillfully used it would work out its own praise, and its capacity for usefulness be truly marvelous," it was a fact of preservation. When,

more recently, I said that "the cause of alveolar abscess was not a dead tooth, but the *presence* of a dead nerve in the tooth," I was but enlarging the area of fact. When I said of the Rubber Dam that "it would keep cavities perfectly dry in even the wettest parts of the mouth, unassisted by any of the appliances previously used for that purpose," and "that it is one of the very best aids to the highest professional achievements," it was an elastic and comforting fact. When I said that Amalgam was a "special providence," accomplishing and securing the salvation of myriads of human teeth which would otherwise have perished," it was a fact of increased mastication. When I declared the "six year molar" "one of the greatest mischief-makers in the human mouth," it was a fact on crowding. When the "Dens Sapientia" was proclaimed by me, "the strongest of all the molars," it was a substantial fact, founded in wisdom, and written all over its flinty surface. And when, at last, I announced the axiom that "contact among human teeth is always dangerous—its continuance a constant menace of evil—that it is a frightful and prolific source of disease, in that it presents the opportunity, invites attack, and provides a secure harbor for inimical forces," I uttered a fact paramount, a truth self-evident to all who possess the faculty of intelligent observation and perception. That the causes and sources of dental decay are growing in number is a lamentable and painful fact. The chemist, the physician, the confection and condiment makers, are all equally active in this work of disintegration and demolition, and the result is a fact of destruction. In all seriousness I ask, Is this profession sufficiently awake to these alarming and momentous facts? Will it indeed be equal, in the future, to its glorious mission? Will its ability to save, be greater than the power of antagonistic forces now set against it, arrayed and arraying for its defeat? I know that the victory can rest on our side, only as we are faithful. We can be faithful only as we become wise in cause and effect. We can baffle disease only by attacking its cause, and our crowning victory will come, if it come at all, by our ability successfully to *prevent.*

Dr. W. H. Atkinson read a paper upon "The Differential Character of Caries and Necrosis."

Adjourned. WM. JARVIE, JR., *Rec. Sec'y.*

A doctor went out for a day's hunting, and on coming home complained that he hadn't killed anything. "That's because you didn't attend to your legitimate business," said his wife.

THE GERM THEORY AND ITS RELATIONS TO HYGIENE.

BY PRESIDENT F. A. P. BARNARD, LL.D., OF COLUMBIA COLLEGE.

The following interesting paper, by F. A. P. Barnard, LL. D., President of Columbia College, on the Germ Theory of Disease in its relations to Hygiene, was read before the American Public Health Association. After a few remarks on the general recognition, among educated men, of the universal reign of law and order, Professor Barnard said :

The germ theory of disease is not, as is commonly supposed, a theory which has originated in very recent years. More than two hundred years ago it was brought forward, at least as a hypothesis, by the celebrated Father Kircher, in his *Scrutinium physico-medicum contagiosæ luis quæ pestis dicitur*, to account for the infectious propagation of the plague. However plausible this theory might at the time have seemed, it could then, nevertheless, claim no higher rank than that of a bare hypothesis ; and it has only been in times comparatively recent that observation has brought to light a sufficient number of facts apparently favoring it to justify our advancing it, in the arena of scientific discussion, to the higher dignity of a theory.

Before proceeding to consider the evidence bearing on the truth of this theory, for or against, a few observations of a general nature may properly here find place. No living organism enjoys an existence of unlimited duration. Every such organism, under favorable circumstances, passes through three distinct stages, which are those of growth, vigorous maturity, and decline. The organism commences as a germ, and ends in dissolution and disintegration. Since the laws of life, as well as those of physics, are fixed and definite, there is reason to believe that all organisms of the same species, if placed in conditions equally favorable to their development, would be equally long-lived ; yet, in point of fact, those which pass through the regular stages constituting their normal life are comparatively few. In the large majority, the vital functions are, earlier or later, more or less disturbed, if not arrested, by an endless variety of causes tending to produce disease and premature death. In the human race, life is often shortened by ignorant or willful disregard of the conditions necessary to the preservation of health. Accident, also, often exposes individuals to deleterious influences. Thus, in many cases, diseases arise from exposure to extremes of temperature or from excesses in eating and drinking, persisted in until the organs of digestion become debilitated, and fail to fulfill their

proper functions. But besides these causes of disease, which may be classed under the head of "injurious conditions," there are other influences directly morbific, which, whenever they come into play, cut short the duration of life. Poisons belong to this class, but the effects of these are felt only in occasional and accidental instances. Other noxious influences, of which the pernicious consequences are more widely spread, are those which produce the diseases called zymotic. Such are malaria, contagion, and infection, instrumentalities to which are owing the wide-spread ravages of epidemic.

It may be remarked that there are many cases of disease in which the cause is not traceable directly to any of the sources above mentioned, but in which the disease has been transmitted by inheritance from a parent similarly affected. In such cases there is nevertheless every reason to believe that the disease in its first appearance was produced in a healthy organism by causes belonging to one or the other of the classes above named.

The diseases which it is the object of the present paper to consider are only those which belong to the epidemic or contagious class.

THE EPIDEMIC OR CONTAGIOUS CLASS OF DISEASES.

No subject has occupied more the careful attention of physicians, or has been a subject of more elaborate observation and experiment, or has led to more marked difference of opinion, or more animated controversy, than that of the nature of the influences by which these diseases are transmitted from individual to individual. That many epidemics arise from peculiar conditions of the atmosphere, not in the least, as yet, understood, can hardly be doubted ; and in this case the influence which excites disease simultaneously in many is not dissimilar to that by which contagious diseases are transmitted from individual to individuals. Two theories, distinctly opposed to each other, have long been held on the subject. These may be distinguished as the chemical theory of infection, and the germ theory. The chemical theory is founded on a presumed analogy between the propagation of disease in living organisms and the process of fermentation in certain forms of organic matter without life. This theory assumes a ferment to be an organized substance in a certain state of decay, which possesses the property of exciting the same decay in other organic substance with which it is in contact. Applying this theory to disease, it supposes that infection is communicated by the instrumentality of particles thrown from the person, or from substances proceeding from the person diseased, and borne by the air to other persons in full health, in whom

they excite, probably by contact with the membranous linings of the lungs, the same diseased condition which exists in the patient. The opposing theory presumes that the diseased person is suffering from an invasion of his system by microscopic algoid, or fungoid vegetative forms, having the property of rapid self-multiplication, and that the spores which proceed from these fungi or the cells of the algæ are wafted in like manner by the air from person to person, penetrating the systems of the healthy, and establishing new colonies to generate disease in them.

A *prima facie* evidence, which, so far as it goes, is favorable to the germ theory, is found in the well-known fact that all the forms of cryptogamic vegetation are propagated by spores, which they shed freely abroad in all directions, and that these are borne in infinite numbers through the atmosphere, which they pervade near the surface of the earth in all places. The fact of their universal presence is made manifest by the promptitude with which fungoid growths spring up in all circumstances in which the conditions favor their development. We know that the numbers of spores which all fungi produce are incalculable. The larger fungi give us evidence of this. The spores of a single puff ball have been estimated to be more numerous than the entire human population of the globe. It is true that to ordinary observation the presence of foreign matters in the atmosphere is not perceptible, except when such foreign matters take the gross form of clouds of smoke or dust ; but particles of smoke or dust, and in general of all inorganic substances, are so heavy that they soon subside ; yet when the air is thus left apparently free from all foreign admixture, it is demonstrably full of organic particles so extremely light as not to subside for many hours, or even days, of perfect rest. The chemist, it is true, is unable to detect them by his tests, delicate as they are ; for being organic, and composed in general of but two or three elements—which elements are in great part those of the atmosphere itself—they produce no distinctive reactions under the ordinary processes of analysis. But there is a mode of analysis much more delicate than even that of the chemist. It is that which has been applied incidentally to this question by Professor Tyndall, in his interesting investigation into the chemical effects of light upon vapors. Professor Tyndall discovered that there are many substances of great volatility, which, when in the state of vapor, are easily decomposed by light. He found that a perfectly transparent vapor-like steam, when traversed by a luminous beam, is absolutely invisible ; while we all know that if we admit a beam of sunlight into a

darkened room, through an aperture in the shutter, the path of the beam through the apartment is as distinctly marked as if it were a solid bar. That this visibility of a beam of light in the air is not owing to the power of the aerial particles themselves to reflect light, is demonstrated by him by proofs entirely conclusive. A beam of light from an electric lamp was made in his experiments to pass through a large glass tube closed at both ends by plates of glass, ground on. No light was permitted to escape into the room; and, accordingly, when the tube was exhausted of air altogether, and no light from its interior was reflected to the eye, it was perfectly invisible. But if the air of the room were allowed to re-enter it, it immediately became brilliantly luminous, as in the case of a sunbeam admitted through a window-shutter. He showed, however, that a filter of rather closely compacted cotton will shut off entirely, or almost entirely, the organic matters which the air contains; and he showed, finally, that absolute rest for a long period of time will cause these particles completely to subside. He constructed a closed space, cubical in form, and several feet in linear dimensions, glazed so as to permit him to pass through it a beam of light, and to observe the path of the beam. This small apartment was made absolutely air-tight, and left to itself. On each succeeding day the brilliancy of the transmitted beam grew less and less; and at length, at the end of a week, it could no longer be perceived at all. The apartment was optically empty.

THE AIR FILLED WITH ORGANIC MATTER.

It is not necessary to suppose that all particles of organic matter are living germs of vegetable or animal organisms; but when we see how constantly such organisms spring up wherever the conditions favor germination, it is impossible to doubt that a vast many of them have this character; and that these are the source of those growths of minute cryptograms which thus seem to spring up spontaneously. There is no mode of accounting for such growths, except to suppose that they are actually spontaneous; and accordingly the view has been taken by some physiologists, perhaps I should say many, that the true mode of accounting for the appearance of microscopic forms of life is to suppose that they originate without organic antecedents, or, as they expressed it, *de novo*. No question at the present day is more sharply debated than that which relates to the origin of life. There is no subject which has been pursued experimentally with more zeal, more earnest solicitude to reach the truth, and with more singularly discordant results, than this. The notion of spontaneous generation is not, by any means,

of modern origin. It has been entertained by naturalists in every age since the dawn of scientific history. But the earlier naturalists, Aristotle and Lucretius, for instance, conceived that organisms of a high order of complexity, such as insects, or fishes, or reptiles, might be directly produced out of the moist earth softened by showers, or out of the slime and mud of rivers; whereas those of our time have long since abandoned any such extravagant notions, and confine themselves to the assertion that life in its spontaneous origin is manifested only under the simplest forms.

Less than three centuries ago the belief that living things may originate without eggs, or germs, or living parents from which to proceed, may be said to have been universal in Europe. Of the truth of this belief there was supposed to be visible evidence in the invariable occurrence of maggots in putrefying flesh. The doctrine was held as matter of faith, and those who first assailed it were naturally accused of impiety and irreverence. Prominent, and perhaps first among these, was Francis Redi, an Italian philosopher, scholar and poet, born in 1626. He presented a conclusive disproof of the spontaneous generation of maggots in putrefying flesh, by simply inclosing, in an open mouth jar covered with gauze, pieces of flesh still sound, and leaving them in the sun to putrefy. Putrefaction occurred as before, but no maggots made their appearance. The maggots, nevertheless, did appear on the gauze, and a little observation made their origin manifest. The flies, of which they are the progeny in the larval state, being attracted by the odor of the flesh, but unable to reach it, laid their eggs upon the covering of the jar, and out of these the larvæ were presently developed. Having demonstrated the falsity of the popular belief on this subject in a case so conspicuous, Redi naturally generalized his conclusion, and took the ground that no living thing comes into existence without deriving its life from something previously living. He did not say, as it has been said later, "*omne vivum ex ovo*," but "*omne vivum ex vivo.*" He still believed that out of a living plant may arise a living animal, as the insect within the gall of the oak, or the worm within the fruit which presents no external puncture. His doctrine was, therefore, that which Huxley has named *biogenesis*, in contradiction to spontaneous generation, called by him *abiogenesis*, and by Bastian *archegenesis*. But *archegenesis* had been put aside only to return again under a new form. Among the earliest revelations of the microscope was the remarkable fact that whenever a dead organic substance is infused in water, myriads of minute creatures presently make their appearance in the infusion, all pos-

sessing most extraordinary, and many of them very varied powers of reproduction. They multiply by means of *ova*, by means of buds, or gemmation, and by means of self-division, or fissuration. All this was strongly favorable to the doctrine of *biogenesis*. Where so many means of reproduction existed, every one of them so effectual and sufficient, to provide that the same forms of life should be produced without any organic antecedents, seemed "wasteful and ridiculous excess." This view, however, met here and there with a dissentient. About a century and a quarter ago, John Thurberville Needham, an English naturalist, resorted to an experiment which, with various modifications, has been since repeated many hundreds, possibly many thousands of times, with the view thoroughly to test the question whether, in its application to infusorial life, the doctrine of *biogenesis* is universally true. He prepared an infusion, thoroughly boiled it in a flask, corked it tight, sealed the cork with mastic, and covered the whole with hot ashes, designing to destroy by heat any germs which might be in the infusion, in the substance infused, or in the air above the liquid in the flask. After some days or weeks, he found that, notwithstanding all these precautions, living organisms did make their appearance in the flask, precisely such as, in freely exposed infusions, habitually appeared earlier. This experiment was immediately repeated by Spallanzani, an Italian ecclesiastic and naturalist; but Spallanzani, instead of corking his flask, and cementing his corks, sealed the vessels by fusing the glass; and having thus completely cut off communication with the outward air, kept them at the boiling temperature for three quarters of an hour. No life appeared in the infusions of Spallanzani, and the doctrine of *biogenesis* was again apparently triumphant.

NOTE ON SALICYLIC ACID.

By Edward R. Squibb, M. D., of Brooklyn, N. Y.

Read before the Medical Society of the State of New York, Feb. 2d, 1875, and by permission printed in advance of the Transactions.

This substance, long known as a rare and curious chemical, derived from the vegetable kingdom, has lately been brought into prominent notice, chiefly in Germany, from its relation to those changes which are commonly known and best understood as fermentations, to which class or kind of changes so many diseases and pathological conditions are now pretty well known to belong.

The writer knows far too little of the subject and its relations to attempt an accurate or exhaustive paper upon it, and the object of this note is simply to call attention to it, that it may be read up in the current literature—to give a brief outline of its bibliography, that reference may be made in regard to its history—and to offer some thoughts in regard to its sphere in medicine.

Salicin is a glucoside, or neutral vegetable principle, discovered by Leroux* in 1830, in the bark of some species of willow, Salix, whence its name. It was afterwards found in various species of poplar,† and in other trees and plants. Salicin was chiefly investigated by Piria,‡ who gave an elaborate account of its derivatives, and among these, of salicylic acid. Early in its history the acid was prepared by Löwig and Weidmann § from the flowers of Spiræa ulmaria; and later, a research by Prof. Procter,‖ of Philadelphia, showed that our oil of wintergreen, Gaultheria procumbens, was really a salicylous ether; and from this source salicylic acid was obtained by Cahours.¶ Gerhardt,** Ettling,†† and others contributed to the researches by which the properties and reactions of salicylic acid were accurately determined and its composition fixed; but as yet it was but a chemical curiosity whose potential possibilities were quite unknown. It still belonged to that class of substances which had simply consumed a large amount of patient labor, and in relation to which the rigid utilitarian asked Michael Farrady, "What is the use of such things?" and received for reply the answer, "What is the use of a baby?"

The physiological and pathological effects of salicin, though imperfectly investigated, seem to have gradually and slowly directed attention to those of its derivatives, and occasional paragraphs have appeared in current scientific literature, from time to time, upon salicylic acid for some years past. But only within a year or two—and the writer regrets that he does not know by whom first—German writers have alluded to its peculiar and powerful effects as an antiferment and antiseptic. As its peculiar powers were recognized, and its importance became possible and probable, the sources from which it had been obtained as a chemical curiosity became impracticable, in consequence of the small quan-

* Journ. de Chim. Med. T. 6, F. 341.

† Braconnot, Ann. Chim. Phys. T. 44, F. 296.

‡ Piria, 1, Compt. Rend. T. 6, F. 388, and Ann. Pharm. T. 30. F. 165.

§ Jour. pr. Chem. Bd. 19, S. 236.

‖ Amer. Journ. Pharm., v. 14. p. 211.

¶ Compt. Rend. T. 16, F. 863.

** N. Ann. Chim. Phys., T. 7, F. 217.

†† Ann. Pharm, T. 53, F. 77.

tity which could be obtained from them, and the great cost in material and labor.

The next step in the progress of salicylic acid toward practical utility affords an excellent illustration of the progress in chemical knowledge made of late years.

The modern chemist appears to know, within certain limits, the combinations of the elements in organic substances very much as he knows the axes of crystals, and hence deduces their planes of cleavage. That is, he knows how they will split up under given conditions, and what new arrangements of their elements are possible, or even practicable. And farther, he knows by pure reasoning upon facts, what new elements to introduce between the molecules of one combination to split it up by a new set of affinities into new combinations never before seen or reached, and which would have remained long unknown under the mere empirical researches of the older chemistry. The peculiar properties and reactions of salicylic acid as an antiferment producing a demand for it, the German chemists, Kolbe,* and Lautemann sought for an organic compound which, from its elementary composition, might be split or dissociated into the desired new compound salicylic acid. This substance, whose molecule might be broken up, they found in Phenol, or the so-called Carbolic Acid, and it is a very curious circumstance—purely accidental, so far as this writer knows—that a substance of well and long-established character as an antiferment, should have offered to these chemists a molecular constitution so well adapted to be broken up into a still more powerful antiferment; for there is no relation whatever—either in composition or chemical or physical properties—between carbolic acid and salicylic acid, except in their effects as antiferments, and the two may, so far as present knowledge extends, accomplish these effects by similar or by altogether different reactions. The agent which the German chemists selected to resolve the molecule of Phenol into other molecules, one of which should be salicylic acid, was dry carbonic acid or carbonic anhydride, as it is called in the new chemistry. Thus, from the action of carbonic acid on carbolic acid, salicylic acid is produced; a process which is about as far from the original willow tree as a source of the acid as can well be imagined, and yet a process which is as much the result of human knowledge based upon human research as that by which Le Verrier and Adams discovered the planet Neptune. It appears that where Phenol or Cresol, and per-

* Archiv. der Pharmacie (3) v. 5, p. 445, from Jour. fur Practische Chemie. Bd. 10, S. 89, and quoted in Ding. Polyt. Journ. Bd. 214, S. 132, and in Pharm. Jour. and Trans. of London, Third series, No. 231.

haps others of the class of phenols, are combined with an alkali metal such as sodium or potassium, thus forming phenol-sodium (often called phenate of soda) for example, and well-dried carbonic anhydride is passed through the dry powder of phenol-sodium heated to 100° to 250° C.=212° to 482° F., the reaction occurs which produces salicylate of sodium and other compounds. The salicylate of sodium thus formed is dissolved in water and decomposed by hydrochloric acid, which, uniting with the sodium by superior affinity, sets free the salicylic acid in the form of small crystals. These crystals are washed and recrystallized from a hot solution, and when dried, form a crystalline powder of a light-brown color, somewhat resembling in color the powder of pale cinchona bark. This is unbleached salicylic acid, and is probably pure enough for almost all, if not for all the purposes to which the acid is at present applied to practical uses. The small proportion of coloring matter which it contains in this condition is held by it with great tenacity, and the further processes by which it may be obtained of various shades up to whiteness are so difficult, troublesome and expensive, that they more than double the cost of production. This bleaching may be accomplished in various ways to a certain extent, but to get the acid quite white, Kolbe recommends that it be converted into an ether, and this ether be again decomposed. In the writer's practice no good plan of decolorizing has yet been reached, and as the decolorizing has not yet been shown to be necessary or very useful, no great attention has yet been given to it. The acid imported from Germany at very high prices is occasionally quite white; but most of that sold at the more moderate prices of two to three dollars per ounce is of various degrees of whiteness, up to a very light cream color with a reddish tinge. These varying shades of color seem to show that bleaching processes, more or less effective, have been used with all the acid yet imported into this country; while, so far as known, none has been made here until the writer lately undertook it. Hence the entirely natural, or entirely unbleached acid has not, so far as known, been yet used to any considerable extent; and it is a mere reasoning process based upon the quantity and qualities of the coloring matter in the well-made, unbleached acid, by which it is inferred that for most, if not for all of its present uses, this is as good as the more or less bleached product. If the well-made, unbleached acid be found to subserve all the useful purposes to which the substance may be applicable, as is confidently expected by this writer, and if the substance should even in moderate degree realize the expectations of its importance in the arts, and in medicine, as indicated by

the European authorities, the process of Kolbe will make it practically attainable in the necessary quantities at a far lower cost ; whilst without some such process it would be of very limited use to mankind, whatever might be its powers. Whether bleached or unbleached, the acid is in minute broken acicular crystals, which give it the appearance of a granular powder, soft and smooth under the pestle or knife, but somewhat rough or resinous when rubbed between the fingers. This powder is odorless and nearly tasteless. It has, however, a sweetish and astringent after-taste with slight acridity in the fauces, but none in the mouth ; and though tasteless, it leaves a disposition or inclination to expectorate, which continues for some time.

It is practically insoluble in cold water, but is very soluble in hot water ; and the water of a hot solution retains when cold, in proportion to its coldness, from about one part in two hundred and fifty, to one part in five hundred of the solution. The presence of various neutral salts in small proportion in the water render it far more soluble. Up to this time phosphate of sodium seems to have been chiefly used in Germany* to render it more soluble in water for medicinal purposes, and it is said that three parts of phosphate of sodium will render one part of the acid easily soluble in fifty parts of water. It is much more soluble in alcohol and ether than in water. It melts at about 125°C= 257°F., and sublimes at about 200°C.=392°F.† In common with other similar acids it forms salts with the principal bases, but these seem thus far to be difficult to make, and their effects have not been investigated.

It is used for medical and surgical purposes, either dry or in solution. When used dry it is sprinkled on to wounds, ulcers, or dressings in the form of very fine powder, in very small quantities, either simply powdered or mixed in various proportions with some diluent, such as starch. When used in simple solution, either for spraying surfaces or for washes or gargles, it is used in tepid solution of about one part to three hundred parts of water. Where stronger solutions are required for washes, gargles, or to moisten dressings, one part of the acid and three parts of phosphate of sodium to fifty parts of water have been used. When applied to wounds, it appears immediately in the urine.‡

Its alleged advantages over all other antiseptics are, first, that it is far more powerful and effective in smaller quantities ; and, secondly, that

*Thiersch. Pharm. Centralhalle, Oct. 22, Nov. 5.
†Watts' Chem. Dictionary, Art : "Salicylic Acid."
‡Thiersch, as above cited.

it is, in all quantities necessary for complete effectiveness, entirely devoid of irritant action upon the living tissues. It is not caustic nor corrosive in any quantity, and never produces inflammation. In large quantities it may be irritant and painful, but yet rarely surpasses a stimulant effect, while it appears to be quite neutral in the very small quantities which are yet thoroughly effective. Thirdly, it is said to reach and prevent processes of decomposition which are beyond the reach of all other antiseptics or antiferments. These processes are of two kinds, namely—vital, or those in which living organisms have an important part, such as that produced by yeast, and many of those which occur in putrefaction; and chemical, or those which occur independent of vitality, as the production of the volatile oils in mustard and bitter almonds, the effect of diastase, etc. Now, while carbolic acid and other antiferments are azymotic, or completely arrest or prevent fermentations of the first kind, they are powerless with the chemical processes. Salicylic acid is said to be more effective with the vital ferments, and equally effective with the chemical. Fourthly, in quantities said to be thoroughly effective, it is entirely odorless, and tasteless, and harmless, whilst it has no poisonous effect in any reasonable quantity.

It prevents or arrests the souring of worts, washes, and beers of the brewers, and prevents or arrests the putrefactive agencies which are so troublesome and destructive to the glue manufacturers; and these and similar trades have thus far seemed to be its principal consumers. Separate portions of fresh milk set aside to become sour, one to which 0.04 per cent. of salicylic acid was added soured 36 hours later than the other. Urine thus protected was on the third day still clear, and free from ammoniacal odor.

Varying proportions of the acid added to accurately measured separate portions of sweet milk, and these carefully observed afterward until they sour—or, by the use of meat juice instead of milk, observed closely for signs of putrefaction—would offer good indications of the quantities required to arrest these varieties of fermentation.

Professor Thiersch, of Leipsic,* used it upon contused and incised wounds, and in operations, with excellent general results, destroying the fetid odor of cancerous surfaces, and pyæmic ulcerations. To such uses this writer would add the suggestion that for washing out the cavities of the abdomen and chest after those operations which tend so strongly to septicæmia, solutions of salicylic acid would seem to offer very great advantages should it prove to be as bland and unirritating as it is stated to be, and yet so effective.

*Pharm. Centralhalle, Nos. 44 and 45, 1874.

Most of these statements are summed up from the periodical literature of continental Europe during the past six months, little having appeared upon the subject in Great Britain, or in this country, and nothing having been done with it so far as known in either country.

In occasional paragraphs and allusions, benzoic acid has been coupled with salicylic acid as being only second to it in effectiveness as an antiferment, and with similar advantages.

These statements are collated and condensed here as being well worth attention in themselves, and in their relations to the phenomena of septic poisoning as already known. But they have a new significance, or at least suggest to this writer a new train of thought when viewed in connection with some researches now in progress and but just appearing in the periodical literature.

Experiments* were made upon animals by the injection of measured quantities of septic blood. The blood of a healthy animal was allowed to become putrid. Increasing doses of this were injected into healthy animals until the amount necessary to cause death was ascertained. This quantity proved to be large, the animals recovering from all the small doses. Blood from the animal whose death was caused by injections of putrid blood was injected in increasing doses into healthy animals until the fatal dose was reached, and this dose was found to be smaller than that which killed the first animal. The blood of the second dead animal was used on healthy subjects in the same way as that of the first, and proved fatal in still smaller quantity. The experiments were continued upon the same plan until finally a point was reached when a very minute portion—the fraction of a drop, perhaps—from the last animal proved fatal to the next, with more violent toxic symptoms and a shorter course. The important indications of this series of experiments is of course the rapid accumulation of potency in septic poisoning. And the question put by this indication is not only as to how this potency accumulates, but also how to prevent and arrest it. Metro-peritonitis, and common pyæmia would doubtless, unobstructed, accumulate potency in the same way without visible inoculation, and often do continue and accumulate even against the vigorous application of the best means of prevention yet known. No hypothesis can be constructed that will embrace the phenomena of septic poisoning as they are now rapidly being investigated without including zymotic diseases and the cachexiæ, and none will account for the phenomena already

*Bergman, Panum, Davaine, Vulpian and Bouley—the latter researches in Bulletins de l'Acad. de Méd. 1872, 1873, and Davaine, translated by Mary C. Putnam, M.D., in Archives of Scientific and Practical Medicine, by C. E. Brown-Sequard and E. C. Seguin, No. 5, p. 469.

observed without bringing it within the sphere of what is called, in some of its degrees or phases, fermentation. Hence, if the medical art is to keep pace with the progress of the physical sciences, physicians cannot afford to pass by such articles as salicylic and benzoic acids, when offered by chemistry, without investigating their effects upon disease, even though not one out of ten should repay the labor of investigation; for it is certainly in this direction of research that medicine must look with greatest hope of success to control those abnormal vital processes which so far may be modified, but not stopped. For example : Suppose a primary syphilitic or cancerous sore, or a diphtheritic patch, or even a cachectic pulmonary infarction, while these are merely the localized phenomena of an external inoculation, or of an internal taint, they must all be considered to partake of the nature of a fermentation, and by some such process invade the whole organism. Then suppose an antiferment, which, when applied to any surface not covered by an impervious cuticle, very soon appears unchanged, first in the blood and then in the secretions and excretions—the manifest logical antagonism of such substance to the diseased conditions becomes too important to be neglected, and the counsels of wisdom demand that its claims to such antagonism be disproved before it be dismissed. The question as to what may become of the cancer-cell, or of the less tangible precedent cause of it, or of the bacteria, or the precedent conditions which increase their fertility, under the well-directed influence of this class of agents, is, perhaps, the most important one in all medical science. And just in proportion as accurate research develops agents of greater and greater power, will be the prospect of better success in treatment.

The phenols, especially the so-called carbolic and cresylic acids (Phenol and Cresol), were, and must always remain to be, most important additions to this class of agents, surpassing in power all that had been previously tried. And if now salicylic acid shall prove more potent than the phenols the farther gain will be very great, and the researches upon it will again lead up toward future discoveries of still greater power.

BROOKLYN, February 1, 1875.

A physician, on presenting his bill to the executor of the estate of a deceased patient, asked, "Do you wish to have my bill sworn to?" "No," replied the executor, "the death of the decedent is sufficient evidence that you attended him professionally."

OUR LONDON LETTER.

LONDON, June 8th, 1875.

We are having summer here all in a hurry. May was, on the whole, pleasant, until within a day or two of its close, when a spell of cold weather reminded the natives that winter was still within hail. The last few days, however, have seen a decided change, and the glass has gone up to 74° in the shade. Of course such a sudden accession of heat aggravates the usual laborious nature of the dentist's work, and a large interstitial stopping becomes a good substitute for a Turkish bath. The profession generally enjoyed a like luxury last Thursday evening, when the President of the Odontological Society gave a *conversazione*, and all the available rooms of the Dental Hospital, and those belonging to the Society, were thrown open to the guests. The walls were covered by a fine series of oil and water-color paintings, lent by members of the profession, and, if we may judge from the quality of the exhibition, the London dentists are not deficient either in money or taste. The value of the collection must have been very great, as all the pictures were either by ancient or modern masters of the art, and many were of historical fame, as specimens of the artists' best style. In the committee room was a very splendid set of line engravings by Morgan and Volphato, representing the relievos in the Vatican by Raphael. This collection is almost unique for completeness and excellence of preservation. The ordinary specimens in the museum were increased by the addition of specimens of ancient porcelain and one or two collections of Chinese and Japanese carvings. Thus do extremes meet : The fine old porcelain vases stood alongside the historical case of mineral teeth, which shows the progress made in their manufacture from the earliest stage down to the present time, and the hard, polished, ivory carvings stood beside the brown, distorted, half-rotten specimens of the art of dentistry in a by-gone age. We had the pleasure of seeing two of our American brethren here ; one has settled among us, and another was from Geneva in quest of health, which we all hope he may find. There was a large display of microscopic specimens arranged by Mr. C. S. Tomes, forming in themselves an educational series in Dental Physiology and Pathology. Amongst the instruments exhibited was an ingenious adaptation of the principle of the self-registering thermometer. A fine platina wire is introduced into the tube, and when the column of mercury rises to the

wire an electric current is completed, and a bell rings, telling that a certain elevation of temperature has been reached. The application of such an instrument to vulcanizing purposes is obvious. The affair was a success. The time was spent pleasantly, and it was gratifying to see how our respected President was supported by scientific men of the highest reputation.

By a letter from an American correspondent in the *Monthly Review of Dental Surgery*, it is pleasant to see that all criticisms on matters American are not received as evidence of "bitterness and jealousy and wounded self-esteem," and that the education of dentists is receiving more and more of the attention which it deserves. Rightly the writer says that America made the start, and if she has fallen behind in the race she will soon bring up her lost ground. The Harvard Dental School is showing the way; I read of the step with unfeigned pleasure. May every success attend such enterprise. In the midst of much talk this is being "doers of the word, not hearers only."

I thank you very much, Mr. Editor, for your kindly interpretation of my remarks about testimonials. I hope I avoid personalities, at least in disagreeable matters, and try to give my attention to "measures, not men," although in the function you have set me to discharge I would not hesitate to be direct in my allusions, did necessity arise. I am sure the gentlemen in possession of the subscription list referred to in your May number were as pleased to have an opportunity of explanation as I am to repudiate any personal allusion to men I do not know further than by name, and towards whom I have no other feeling than that of professional friendship.

The champion of the "American Dental Society of Europe" seems very much displeased with my few remarks on his pet institution. I shall not attempt to reply to his letter, inasmuch as abuse is neither pleasant nor profitable, and I cannot argue when no argument is used against me. There are, however, one or two points in his letter which demand notice. First, as to the cause of his writing—"Only when American Journals permit correspondents of the Vagrant order to attack us." *This* is why the "pen is lifted." I hope that this gentleman has no desire to gag the American press. To my mind, an American Journal was, of all others, the proper medium of criticism on an American Society. Second, the signature to a letter may be real or assumed; it is a matter of opinion, and sometimes a matter of expediency, which is best, and the question will not be settled by abuse, nor

by Mr. Wright signing his name. Third, I did not use the word "expatriated" in an offensive sense. Fourth, that if I have been misinformed as to the object of the Society I must blame its custodians for allowing such statements to go forth uncorrected. Here are the words now before me, "and to establish the dental profession in Europe on the same grade of a liberal and learned profession which it holds in the United States. The next session will be held in Hamburg, on the first Monday of August, 1875." I am ready to express regret if I have been misled, but must blame those who have the care of the Society if I am wrong. If I am right I do not retract anything I have said as to the nature of such an assumption. Fifth, I wish the Society in its scientific capacity every success, and beg to say I have no feeling but the best toward it professionally; and lastly, I beg to say that having the honor to be your correspondent is as good a guarantee of my respectability as if I signed my name. If I had done so what would Mr. Wright have done for a peg to hang his abuse upon?

Last night saw the close of the session of the Odontological Society. Amongst other business a paper was read by Mr. Makins, author of a "Manual of Metallurgy," on the Manufacture of Palladium and Peculiarities which bear on its Amalgamating Qualities. Now that the voice of Amalgam is heard in the land, this paper and discussion will prove a valuable addition to the literature of amalgams. The close of the meetings is always a source of regret. As next month and August are the times when we expect visitors from the far West, and as the members of the profession begin to scatter about that time, we may appear rather remiss in our attentions to our trans-Atlantic brethren. Still, there are always a few left who are happy to receive introductions, and do their bearers all the civility they can. We hope to welcome not a few this season, as next year they may wish to stay at home to get ready for the approaching centenary commemoration. May every one be as peaceful as the coming one promises to be is the sincere wish of

Yours as hitherto,

VAGRANT.

A lecturer aptly demonstrated the theory that heat generates motion, by pointing to a boy who had accidentally set down on a piece of lighted punk.

NOTES.

The South Carolina State Dental Association.

The fifth annual meeting of this Association was held on the 4th May, in the city of Columbia, S. C.

The meeting was well attended, and the discussions harmonious, spirited, and interesting.

A Board of Dental Examiners, in accordance with the provisions of the bill recently passed by the Legislature of the State, for regulating the practice of Dentistry in South Carolina, was elected, consisting of the following gentlemen :

J. W. NORWOOD.......Greenville, S. C.
T. B. PATRICK.. .....Charleston, S. C.
T. S. THOMPSON.......Abbeville, S. C.
W. S. BROWN.........Charleston, S. C.
D. L. BOEZER..........Columbia, S. C.

Among the points of interest advanced at this meeting were the following:

Subcutaneous injections of ergotine, and internal administration of same in form of pills, for the suppression of violent and persistent hemorrhage after extraction; application of actual cautery (white heat) by means of electricity, for same purpose; employment of electricity for painless devitalizing of pulp. Dr. Reid spoke against the employment of arsenic, and said that he used with entire success a liniment, consisting of ten grains acetate morphia to the ounce of carbolic acid, which was almost a specific in his hands, curing the worst form of toothache without devitalizing the nerve.

Flattering results had been experienced by many in the use of preparation of oxy-chlo. of zinc, for capping exposed nerves, some using it directly over the exposed part, some using a covering of paper, kid, &c, and some using the white oxide of zinc next the exposed part, and filling over this with the oxy-chlo. of zinc, all flooding the cavity before introducing the filling with carbolic acid or creosote, and all using the rubber dam to protect against moisture. A very favorable report was made by those who had used the "Modeling Compound of S. S. White," for taking impressions of the mouth, report being that it was cleaner, pleasanter to both patient and operator, and taking a sharper impression than any other way.

A like favorable report was made of "Parker and Teague's" impression compound, granting to it all that was claimed for it by the inventors.

The following officers were elected to serve for the ensuing year.

G. F. S. WRIGHT, Columbia, S. C., President.

I. W. NORWOOD, Greenville, S. C., First Vice-President.

B. H. TEAGUE, Aiken, S. C., Second Vice-President.

I. S. THOMPSON, Abbeville, S. C., Corresponding Secretary.

T. F. CHUPIN, Charleston, S. C., Recording Secretary.

T. W. BOWCHI, Cheraw, S. C., Treasurer.

The second Tuesday of June, 1876, was selected as the *time*, and Greenville the *place* for the next meeting.

After an address by the retiring President the meeting adjourned, to meet as above. THEODORE F. CHUPIN,

Recording Secretary.

Georgia State Dental Society.

The seventh annual meeting of this Society was held in Atlanta, commencing May 10, and adjourning May 11, Dr. George Patterson, the President, in the

chair. The meeting was well attended, and fraught with indications of progress in the profession in Georgia. A flattering number of new members were added to the roll. The following reports were read by the gentlemen of the various standing committees :

Chemistry and Therapeutics—Dr. E. Parsons, of Savannah.

Histology and Physiology—Dr. Chas. C. Allen, of Marietta.

Operative Dentistry—Dr. A. C. Ford, of Atlanta, and Dr. M. S. Jobson, of Perry.

Mechanical Dentistry—Dr. S. G. Holland, of Atlanta.

Dental Education—Dr. John H. Coyle, of Thomasville.

The space allotted a condensed report will not permit the reproduction of the debates and interesting papers read by members of the Society at the various sessions.

The address of the President, Dr. Geo. Patterson, was an able and scientific effort, well worthy of the applause it received. By unanimous vote of the Society, one hundred copies of the address were ordered published for the use of the members.

Dr. M. S. Jobson read a paper containing statistics of cases of nerve capping in his own practice. It was a valuable addition to the archives of the Society.

Bearing upon the same subject was a very instructive essay by Dr. W. E. Wardlaw, of Augusta, advocating gutta percha (the ordinary model plate gutta percha) dissolved in chloroform, as a protection for exposed or aching pulps.

Suitable resolutions were read, and spread upon the minutes, in regard to the death of Dr. J. A. Fugua, of Atlanta, an esteemed and honored member of the Society.

One step taken indicating a desire to move onward was the appointing a committee to make arrangements for the purchase of a microscope.

On motion of Dr. E. Parsons, the President appointed a Historian to collect all items of interest in the history of the Society from its origin to the present time, to arrange in suitable form the transactions, essays, debates, &c., and to prepare the same for publication—to report at next meeting.

Mr. M. M. Johnston, of the firm of Johnston Bros., 812 Broadway, New York, was present with the Morrison Chair, Engine and Bracket, also the Elliott Suspension Engine, and an assortment of new instruments, appliances, &c., for the inspection of the members.

Mr. S. S. White, of Philadelphia, kindly sent a collection of instruments, the S. S. White Burring Engine, &c.

The opportunity for inspection and comparison by the members, of so many new and valuable appliances, was one of the best features of the meeting.

On motion of Dr. Jobson, the following was passed :

Resolved, That a vote of thanks be and is hereby tendered to Mr. M. M. Johnston, and to Mr. S. S. White, for their display of instruments, apparatus, &c., and that Mr. Johnston be invited to a seat on this floor during the session.

The annual election resulted in the following list of officers to serve the Society for the next year :

Dr. George W. McEllaney, President, West Point, Ga.

Dr. M. S. Jobson, First Vice-President, Perry, Ga.

Dr. John H. Coyle, Second Vice-President, Thomasville, Ga.

Dr. Chas. C. Allen, Corresponding Secretary, Marietta, Ga.

Dr. D. Smith, Recording Secretary, Atlanta, Ga.

Executive Committee.—Dr. E. Parsons, Savannah; Dr. W. E. Wardlaw, Augusta ; Dr. A. C. Ford, Atlanta ; Dr. W.

F. Tignor, Columbus; Dr. John H. Coyle, Thomasville.

STANDING COMMITTEES. — Histology and Physiology.—Dr. George Patterson, Waynesboro ; Dr. E. Parsons, Savannah.

Pathology and Surgery.—Dr. A. C. Ford, Atlanta ; Dr. McDonald, Griffin.

Chemistry and Therapeutics.—Dr. J. D. McKellar, Macon ; Dr. S. G. Holland, Atlanta.

Operative Dentistry.—Dr. S. G. Robertson, Cuthbert ; Dr. W. E. Wardlaw, Augusta.

Mechanical Dentistry.—Dr. W. F. Tignor, Columbus ; Dr. R. B. Adair, Gainsville.

Education and Literature.—Dr. E. M. Allen, Marietta ; Dr. H. A. Lawrence, Atticus.

Clinical Operators. — Dr. L. D. Carpenter, Atlanta ; Dr. James A. Hart, Hawkinsville.

Historian.—Dr. Chas. C. Allen, Marietta, Ga.

Instruments, Appliances, &c.—Dr. L. D. Carpenter, Atlanta ; Dr. S. G. Holland, Atlanta ; Dr. J. P. Holmes, Macon.

Committee on Microscope.—Dr. A. C. Ford, Atlanta, and Dr. Saml. Hape, Atlanta.

Committee on Arrangements. — Dr. Sam'l Hape, Dr. Wm. Crenshaw, Atlanta.

Delegates to American Dental Association.—Dr. H. A. Lawrence, Atlanta, Ga. ; Dr. M. S. Jobson, Perry, Ga.; Dr. A. C. Ford, Atlanta, Ga.; Dr. Chas. C. Allen, Marietta, Ga.; Dr. J. H. Coyle, Thomasville, Ga.

Delegates to Southern Dental Association.—Dr. E. M. Allen, Marietta ; Dr. J. P. Holmes, Macon, Dr. W. F. Tignor, Columbus ; Dr. R. B. Adair, Gainsville.

The Association adjourned till the second Tuesday in May, 1876.

CHAS. C. ALLEN,

Corresponding Secretary.

New Jersey State Dental Society.

The fifth annual meeting of this Society will convene at the Ocean House, Long Branch, on Tuesday morning, July 6th, 1875, at 10 o'clock, and continue its sessions Wednesday, 7th, and Thursday, 8th.

The annual address will be delivered by the president, Dr. G. C. Brown, of Mount Holly.

In addition to the essays to be read and discussed, subjects of interest and importance to the profession will be presented. It is earnestly hoped all who can make it convenient to attend will be present. An interesting and instructive meeting is anticipated.

The Board of Examiners will be in session during the sittings of the State Society, for the purpose of examining those who are desirous of practicing Dentistry, in accordance with the requirements of "An Act to regulate the practice of Dentistry," &c. Those interested will please take notice.

Dentists in the eastern part of the State desiring information as to the means of reaching the place of meeting, will communicate with Dr. Pinney, 740 Broad Street, Newark.

G. C. BROWN, *President*,
Mount Holly.

J. W. SCARBOROUGH, *Secretary*,
Lambertville, N. J.

American Dental Association.

The fifteenth annual meeting of the American Dental Association will be held in Grant's Hall, Niagara Falls, N. Y., commencing on the first Tuesday of August, 1875.

The Committee have up to date completed the following arrangements.

The Cataract House will accommodate Delegates at $4.00 per day, and the International at $3.50. Rooms will be reserved at either house for parties making known their desires a few days beforehand.

Gentlemen accompanied by their wives should state the fact when ordering rooms.

The N. Y. Central Railroad will sell round-trip tickets from New York to the Falls and return at $17.50.

The Great Western Railroad of Canada will sell tickets for the round trip, at one full fare and a third. Parties desiring to avail themselves of these tickets should ask for excursion tickets to American Dental Association.

Round trip tickets from Chicago, via Michigan Central Railroad, will be sold at $20, which is less than one and a third fare.

The Grand Trunk Railroad will also sell tickets for the round trip at one fare and a third.

The C. C. C. & I. Railroad will sell round trip tickets at the rate of 4 cents a mile one way, to parties of twenty or more.

Any further arrangements will be made known if practicable in the August number.

C. STODDARD SMITH, *Rec. Sec.*
GEO. L. FIELD,
Chairman Com. of Arr.

The Hardening of Plaster of Paris.

Landrin distinguished three phases in the hardening of gypsum by watching its progress under the microscope: (1) the assumption of crystalline condition by the calcined plaster in contact with water; (2) the solution of a certain portion of the crystal by the surrounding water; (3) the evaporation of a certain amount of water by reason of the heat generated in taking up the water of crystallization and the formation of a crystal, which affects the crystallization of the whole mass, just as a crystal in a supersaturated solution of a salt. During the first two phases no hardening takes place, and it is only after some time that the maximum degree of hardness is reached, and the amount of water then present is only double that in the ordinary hydrate or gypsum. A definite mixture of water and plaster, which hardened in ten minutes, was found to lose water gradually for 18 days, until the above composition was reached, when there was no further loss of water.

New Application of the Marsh-mallow.

According to the *Garden*, gypsum, mixed with four per cent. of powdered marsh-mallow root, will harden in about one hour, and can then be sawed or turned, and made into dominoes, dice, etc. With eight per cent. of marsh-mallow the hardness of the mass is increased, and allows of it being rolled out into thin plates, and painted or polished.

New Use for Alcohol.

A new and wonderful application of alcohol has recently been made in the treatment of tumors and cancer. Schwalbe, of Weinheim, reports one hundred cases of various forms of indolent glandular swellings treated successfully by the subcutaneous injection of the tincture of iodine. Latterly he has used injections of simple alcohol in fifty similar cases, and has found the results equally favorable, and the time required for a cure no greater, and he therefore concludes that the alcohol is the essential remedial agent. He explains its curative action as follows: It establishes a state of chronic inflammation in the connective tissue, causing it to contract by degrees, and thus pressure is brought upon the vessels and the lymphatics are obliterated. These effects, and the consequent hardening of the connective tissue, he proposes to utilize in the treatment of other tumors, and he reports the cure of fatty tumors by the use of such injections, to which some ether was added in order to dissolve the fat. He finds, however, the most important application

of his plan in the treatment of cancer by preventing its extension to the neighboring tissues and lymphatic glands. The tumor is first to be isolated, as it were, by causing the connective tissue on all sides of it to become shriveled. Then the contractive connective tissue, approaching the growth itself, presses upon it, cuts off its blood supply, and so causes it to disappear by atrophy. Lymphatic glands which are already affected are to be similarly treated. Schwalbe, with Dr. Hasse, claims to have cured three cases of cancer of the breast in this way.

Measuring Land by the Chemical Balance.

The modern chemical balance gives a greater degree of accuracy in the determination of weights, and with much more facility than any other kind of measurement, especially that of curved lines. This has given rise to a method of determining irregularly shaped surfaces of land in square miles or acres, by tracing them on paper of uniform thickness, cutting it out to the correct shape, and comparing the weight of the piece of paper thus obtained with that of a piece cut to the size of a square mile or of an acre, of the same kind of paper, to the same scale. By calculating how often the weight of the latter piece is contained in that of the former, it will give the number of square miles or acres contained in the land in question. This calculation of course consists in only a simple addition. It may be fully recommended, as, when carefully applied, it gives results the correctness of which is not surpassed by those of any other simple method. This may be verified by taking regularly shaped forms, easily measured by the ordinary methods. We have in this way determined the surface of islands and continents in square miles, of farms in acres, rods, etc., and are compelled to testify that the method is far superior, in the correctness of its results, to any graphic operation, and only superseded by the actual measurement on the field of triangulation of large surfaces.

This way of measuring surfaces by the help of the balance gives less trouble, less calculation, and less liability to error than any other easy method. The only objection is, that the balance cannot be carried along, but requires a quiet place, and a degree of training in its use, only possessed by the chemist, and not by the engineer especially trained in the field in the use of his instruments. — *Manufacturer and Builder.*

Antidote for Carbolic Acid.

Carbolic acid, even in a tolerable state of dilution, is a violent poison, partly in itself, and partly in the alteration it produces in the tissues. It is very much used at present for sanitary and other purposes, and accidents from its improper use are of more frequent occurrence. From numerous experiments, Mr. Huseman has proved that the alkalies and alkaline earths are true antidotes to this acid, while the fat, oils, and glycerine are entirely without effect. The best antidote, according to this gentleman, is the saccharate of lime, obtained by dissolving sixteen parts of sugar in forty of distilled water, and adding five parts of caustic lime. This should be digested for three days, being stirred from time to time, then filtered, and evaporated to dryness. In cases of poisoning, this must be applied in solution, and in large doses, as it is incapable in itself of producing any injurious effect upon the system.

Crystal Varnish for Maps, Etc.

Mix together 1 oz. Canada balsam and 2 oz. spirits of turpentine. Before applying this varnish to a drawing or painting in water colors, the paper should be placed on a stretcher, sized with a thin solution of isinglass in water, and dried. Apply with a soft camel's-hair brush.

DER ZAHNBRECHER.

JOHNSTONS'

Dental Miscellany.

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NUTRITION.

By W. IRVING THAYER, D.D.S., Brooklyn, N. Y.

Oxygen taken into the lungs in the form of air, and appropriated by the corpuscles, circulates. The nutritive elements circulate also. One common law delivers the oxygen and pabulum to the different tissues. *Either* nutritive element, then, is conveyed by the circulation.

The water in which the fish swims comes in immediate contact with its lungs, and from which it receives its oxygen. Take him out of the water, and he dies. You break the connection, stop the circulation, locally or generally, and a part or the whole dies.

The medium which connects with the lungs is far more important than the act of respiration. All animation depends upon this medium. Air for man, water for fish, oxygen for both.

Stop the corpuscles from receiving their normal supply of oxygen, and you have anæsthesia in just the proportion that you shut off the air (oxygen) from them.

One may expatiate upon the theory that anæsthesia is due (in cases of ether and chloroform) to the narcotic effect of the agent used, upon the anterior or posterior columns of the spinal cord, upon the great sympathetic, or upon the entire encephalon itself; which may in part be true, but its primary effects are produced, in the writer's opinion, by the deprivation of oxygen to the corpuscles. An arrest of nutrition to the corpuscles first, which prevents *vivifying nutrition* to the neural tissues, which reflect a partial suspension of other functions, and simulates death—a result of the arrest of corpuscular nutrition.

Nutrition is the result of a varied and long process.

First. The preparation of the food.

Second. The introduction of said food to the mouth, and its comminution, or mastication.

Third. Deglutition.

Fourth. Action of the gastric juice upon the contents of the stomach, which is a process of *minute comminution, grinding to powder.*

Fifth. The emulsion of the fatty portion of the pabulum, which has not been changed by the gastric juice, but is only reduced by the pancreatic juice, or emulsified—*milked out, changed to a milky condition.*

Sixth. Now we come to an exceedingly important factor in the process of nutrition, which enables us to avail ourselves of all the previous labor and preparation of what was put into the mouth. We are well aware that all that has preceded this point would be useless unless that agent was present to perform a special function. The fatty portions of food could not be used without the pancreatic juice, neither could the chyle be absorbed without the peculiar secretion from a certain viscus, to wit: that from the liver. Properly under this sixth head I would place absorption. Then the function of the bile is to induce whatever there is to be absorbed.

Absorption will not take place without the presence of the bile, therefore, it is legitimate to say that the bile *causes* absorption of, of what? everything; in gross, the chyle.

Seventh. Appropriation is the sum total of the process of nutrition.

It may be more or less interesting for us to notice some of the facts connected with this process of absorption.

I should have mentioned before the intestinal juices, which are the secreted product of the follicles of Lieberkhün and the glands of Brunner. This intestinal juice is a colorless and glassy fluid, viscid and mucous in consistency, resembling in its physical characteristics the secretions of the mucous follicles of the mouth; and it has an alkaline reaction. Its function seems to be that of rapidly converting starch into sugar at about 98° Fahrenheit.

Absorption is the process by which the pabulum is taken from the intestines and conveyed into the blood.

In addition to the glands of Brunner and the follicles of Lieberkhün, which secrete the intestinal or an intestinal fluid, and pour it into the intestinal tube, we have certain glandular bodies, which are known as "*glandulæ solitariæ*" and "*glandulæ agminatæ,*" whose function is *not to secrete*, but *to absorb.*

Again, we have in the intestines highly vascular processes, projecting from all parts of the mucous membrane of the duodenum, jejunum and ileum. They are the largest in the duodenum and jejunum, while in the ileum they become fewer in number and smaller in size. They are known by the name of the *villi.*

An estimate of their number has been made by Krause in the upper portion of the tube, at from fifty to ninety per square line (one-twelfth of an inch), and in the lower part of the intestines (I mean above the *ileo-cæcal* valve) at from forty to seventy in the above given space. If this be true, and that it is a reasonable estimate can be easily demonstrated, the total number for the whole length of this portion of the tube would be something over *four millions.*

During the process of intestinal digestion, the fluid which bathes the parietes of this tube is dipped into by these millions of villi, which appropriate unto themselves certain portions of the *chyliferous fluid.* These villi, as can be readily understood, immensely increase the superficial area of the *absorbing* intestinal tract. We have, then, as absorbents in the intestines, at least two separate anatomical agents at work, to wit : the *agminate* and the *solitary* glands ; the former, sometimes known as Peyer's patches, and these innumerable *villi.*

These two sets of vessels are the gateway of two different routes for the digested food and fluids into the circulation. This is an important fact, and has only been established by modern physiology.

The fatty portions of the food are taken up by the lacteals after it has been emulsified and become chyle.

The albuminous and saccharine matters get into the circulation through another channel, the portal vein. The receptaculum chyli is the grand depot for the lactiferous vessels. From this, up through the thoracic duct, the chyle is tipped into the closed circuit, at the junction of the duct and left subclavian vein.

As we have said, after the digestion of food containing starchy, saccharine and animal matter mixed, sugar and albuminose matter are both found in the blood of the portal vein. The last two compounds cannot be found in quantity in the secretions of the lacteals, which finally empty into the left subclavian. The calcareous salts, I believe, take the route of the thoracic duct, go to the left subclavian vein, and from thence into the cavities of right side of the heart.

The chyle in the intestines below the pancreatic duct, and, also if drawn from the lacteals, or the thoracic duct, will be found to consist of oily matter which has not been chemically altered, but reduced to an emulsified state.

The microscope reveals a mass of fine granules or molecules reduced to a minute division, and having the appearance of oil globules. The chyle does not therefore represent the whole product of digestion, but contains in a large degree the fatty and calcareous portions of the food. The saccharine and albuminose matter enters minute blood vessels, and from thence flows into the portal vein through the liver, then through the hepatic veins to the cavities of the right heart, to start upon its circuit.

This venous blood coming from the intestines contains, especially during absorption, much *bile*, which now is believed to be reabsorbed. It has been proved that the flow of the bile is constant, and is not, in a physiological condition, an excrementitious fluid.

The *hepatic cells*, though forming the chief mass of each lobule, are spheroidal bodies, and they may be, or are rounded and flattened from mutual juxtaposition. The size of these cells radiates from the $\frac{1}{1000}$ to the $\frac{1}{2000}$ of an inch, and are now believed to be the chief agents in the secretion of the bile, whose function, as we have said before, is to cause absorption, as this function cannot take place without the presence of the bile.

At this point let me ask, in what of the numerous questions of physiology can a dentist be more interested in, than that of nutrition? His duties require of him to use his best endeavors to continue the normal condition of the organs that nature has designed to be used preparatory to these important functions. Cannot, then, the dental surgeon derive much good to himself, and be better prepared to confer a greater benefit upon his patients, by some kind of apprehension of this process of building up and supplying the right kind of pabulum to the teeth during their formation? *I think so*, for, let me say here, that *teeth once formed, are built up forever.*

I am well aware that in this assertion I shall not be supported by some of my cotemporaries; yet I care not if a thousand and one take issue against me, what I have just said, "built up forever," *is true.*

Under the seventh head we spoke of appropriation, a very important factor in the sum total of nutrition. It will appear important to bear in mind the revolution of a certain fluid, remembering its constant flow.

Oxygen circulates with the blood, being attached to its corpuscles. The nutritive elements circulate also. One common law *delivers* the oxygen and nutritive elements to the *plasma*, and that *conveys it to the tissues.*

Now, the tissues do something. What? *They appropriate.* The

tissues must be animate. There must be *life* in their different individual cells, or else they could *not* appropriate. Where there is no appropriation there must of necessity soon be death. No inanimate substance or thing can perform the function of a living being. Where there is a constant waste there must of necessity be a constant supply, if, and provided a normal standard is maintained. In all tissues of the body thère is a constant waste and supply, with just one exception; and that exception is in the teeth. But in these organs there is a constant waste.

We have said that whatever a tissue required for its nourishment it appropriated unto itself from the plasma. The blood does not go everywhere, but so near to it that it may be difficult to conceive the minute spaces that it does not reach as "blood," but it can only, by its fluid portion, the *liquor sanguinis*, which holds in its embrace, by solution, the pabulum which only can transude the tissues with the plasma.

How much plasma transudes dentine (once built up) *either by endosmosis* or *exosmosis? How much? How much pabulum gets there?* Very little. Very little indeed. "Does not a tooth that has a healthy artery, vein, and mesh of nerves, continue *green*, *alive*, as we would say of a small branch cut from a bush in midsummer?" Yes. "Well now, is it not so with a *live tooth?*" True. "Well now, if no plasma (sap) goes in amongst those calcareous salts in a tooth, pray tell me what is to prevent that tooth from drying up." This: The endosmotic force is at an almost perfect stasis, and the exosmotic transudation is held in check by the former movement, and though the former is not absolutely still, it is nevertheless so minute as to be totally inadequate to supply any nutriment to these tissues. If exosmosis was complete then there would be the same condition of things that obtains in kiln-dried lumber.

Again, the *soft solids* (cells) of the dentine have obtained their *full stature*, and have invested themselves *all around* with a greater or less deposit of the calcareous salts. If these cells were indeed soft solids before they began to deposit lime salts around themselves, they continue so to a greater or less extent during *their* life, as they are never in that state (life) wholly deprived by exosmosis of their watery portions.

What eye ever saw a tooth build up its waste tissue again, save but to a *very limited* extent, in what is sometimes called *secondary dentine*, which the pulp *only* is able to throw over and around itself? None whatever.

They, the soft solids, by a physiological law, exercise a certain function, for a definite purpose, for a given time, and then yield up that power, *never*, NEVER again, to assume it. Once parted with, it is gone forever. These soft solids are completely isolated, I might say, even from the plasma, by their own encasement. How are they to receive, how are they to *let go* their moisture, while endosmotic force is present?

Some of my friends claim that dentine, other than secondary, is deposited after the tooth is fully erupted. In confirmation of this they say, "that teeth grow harder as one grows older." This we admit, but it is accounted for by the fact that the teeth become smaller as they become more aged, hence the calcareous salts lie in a nearer relation to each other, as it is the soft solids which have *diminished* in size, *not deposited more of the earthy basis*. Every surgeon will admit that the bones become smaller, and are constantly desiccating. So with the teeth. With the bones, their anatomical arrangements are very different than with the teeth. They can and do receive plasma. Dentine cannot, and does not. There are no tubules in dentine. No tubes. Cells, and that alone. I believe as life advances in a tooth that the endosmotic power diminishes, while the exosmotic force either remains the same, or increases, if either of these forces can be said to exist. Hence the apparent density, which is only a shrinking of the soft solids and a closer juxtaposition of the calcareous salts.

Secondary dentine has been referred to as a new deposit after teeth have been formed. This is a new tissue, though much like other portions of the tooth, in the sense that scar tissue is similar to other soft tissue, when there has been a solution of contiguity. A point to be noted is, that secondary dentine forms *only* under certain conditions. It is not an adventitious tissue, coming without reason, but is an effort of nature to protect herself. It is a deposit from the pulp, which is a soft tissue highly vitalized, containing a mesh of nerve fibres, an artery and veins, and all conglomerated together by connective tissue into one body. Expose this body, and the immediate result is pain for one thing, and a continued abuse of it may either result in its hypertrophy or acute or chronic inflammation and death. That secondary dentine is deposited, there is no doubt. That it is deposited by soft solids of the pulp, which do receive nutriment unto, and deposit around themselves a certain form of calcareous matter, is equally as certain. But remember that no cell which has encased itself by an inorganic substance, can again exercise such a function.

Therefore I claim that it is correct to say that a tooth once built up is built up forever, and can never again repair any solution of its contiguity, save only in the deposit, (to a limited extent), of secondary dentine, which is a function performed by the soft solids of the pulp, and not those of the dentine.

NOTES ON THE VERDICT OF A CORONER'S JURY—HEMLOCK A POISON.

By A. C. Castle, M.D.

The coroner's inquest recently held in relation to the cause of the death of Dr. Walker, of Brooklyn, presents one of the most singular verdicts, perchance, that has ever been rendered after scientific evidence and morbid anatomy had revealed the facts characterizing the case.

I would premise, that my remarks do not, in the remotest degree, refer to, criticise, nor reflect upon the medical treatment in the case. As far as any diagnosis as to the immediate, remote, or exciting cause of the neuralgic symptoms attending the physical sufferings could be made, the theory and practice of medicine applied to relieve the patient was as good as any other treatment that could have been directed to reach it, because it was impossible to diagnose the singularly complicated diseased condition of the membranes of the brain, the substance of the brain itself, and the several arteries. *Post mortem* examination demonstrated extensive disorganization in active process affecting this organ and its tissues. Not omitting to mention the softening of the substance of the lungs, this morbid condition of the brain, alone, is comprehensively sufficient to enable us to characterize the proximate cause of the pathognomonic symptoms affecting the deceased gentleman when living. Unfortunately for the character of medical science, we have here presented to us one of the too many "obscure" cases deserving the applicability of Hudibras.

> "As if a man should be dissected
> To find the part that is affected."

That the reader may form a judgment upon "the finding of the jury," I give the official report of the post mortem examination. I would mark each and every affection of each and every part of Dr. Walker's brain, &c., which, apart from their contrarieties—I believe I can challenge the post mortem examinations made of a hundred brains of a hundred per-

sons dying of lunacy, mania, softening of the brain, delirium tremens, phrenitis, brain fever, and injuries—all united as one brain, to exhibit in their combined morbid anatomy, the demonstrated extraordinary complicated degeneracy found in the single brain of Dr. Walker.

The official report says, "The brain was of unusual size, weighing fifty-seven ounces." "In the brain," (its substance?) "was a good deal of venous congestion. The *falx cerebri* was slightly *thickened* and *opaque*. The *arachnoid membrane* and *pia mater*," (two vitally important membranes of the brain) "*very much thickened* and *vascular*," (blood vessels enlarged and congested). "The *cruræ cerebri*," (wonderfully vital parts of the brain) slightly *soft*, the right side tearing in removing the brain, *owing* to its *softness*, and presenting a *discolored* appearance. The right vertebral artery, much *larger* than natural, had undergone *calcareous*" (lime) "and *atheromatous*" (curdy, fatty, &c., tumors) "*degeneration*." "The left vertebral artery, much *smaller* than natural, was also affected with the same *calcareous* and *atheromatous degeneracy*" (disorganization). "The post-cerebral and middle" (the back part and middle portions of the brain) "had both *undergone calcareous* and *atheromatous degeneracy*. * * A small *foreign body*—growth—was found on the pia mater. * * The *choroid plexus* was very *vascular* and *thickened*" (engorgement of a peculiar net-work of blood vessels within the ventricles of the brain). "Otherwise" (!) says the report, "the brain appeared healthy" (!)

The report further says: "The lungs were very much congested, *perfectly full of blood*, they were *exceedingly soft*, and in places *tore* during their removal. All the other viscera, heart, intestines, &c., were in a healthy condition, with the exception of a pin-head size atheromatous tumor upon the great artery, the aorta, about a half inch from the heart.

With this elaborately demonstrated pathological condition of the morbid anatomy of the brain tissues, neither the pathologist nor physiology can be at fault in ascribing to this extensive disease affecting the sensorium, the immediate cause of the double vision affecting the eyes, and the tetanic convulsive spasms affecting the muscles of the head and face.

The question for presentation to the jury was, or rather should have been, for their consideration and decision, after the evidence given by the expert making the post mortem examination, and the important evidence given by the medical gentlemen in relation to the quantity, "doses" of hemlock-conium administered to a number of people—first, What are the medicinal properties of conium? Is it a poison, and

if so, under what circumstances, and in what quantity? Second, Did Dr. Walker die from the immediate effects of the conium, or did the doctor's death result from the effects of the extended disease disorganizing his brain and its tissues? The consideration of the latter the verdict entirely overlooks, or altogether ignores.

The expert, from his post mortem examination of morbid anatomy, says: "In my opinion the cause of death *was poison by conium*, producing asphyxia affecting the circulation of the blood, so as to produce a scarcity of breath." Where was his evidence of the presence of conium poison, and what was his test? and what *is the test* for it? and he immediately after acknowledges that he knows nothing about conium but what he has heard from others, and then says: "Suffocation *from any other cause* than that arising from conium"—(Did it arise from conium?)—"would *probably have produced the same appearance of the remains.*" Surely the gentleman does not mean to assert that the thickening of the membranes of the brain, and the calcareous and atheromatous degeneracy of one-third of the substance of the brain, arteries, &c., he had described, would have presented "the same appearance in the remains" if "suffocation" had been produced by drowning, hanging, inhaling noxious gases, &c. Might not tetanic convulsive spasms of the muscles of the throat, in addition to nervous exhaustion—the symptoms of a diseased brain—cause temporary paralysis of the nerves of respiration, hence "suffocation," caused by superinduced *apoplexy* of the lungs, and death? Dr. Walker pointed the attention of his son to his throat while dying. The expert says: The lungs were "*perfectly full* of blood."

Is hemlock a poison in the common definition and acceptation of the word poison? With the ancient Greeks, poison and medicine were synonyms. Let us review the evidence. One eminent medical gentleman says: "The value of conium is determined, but there is *no means* of determining the effect of a dose, except by observation, and the effect of a dose depends upon the idiosyncracies of the patient." Observe its uncertainty.

The fallibilities of scientific evidence in Medical Jurisprudence go to show that neither the theory and practice of medicine, nor chemical analyses in toxicological science, are exact sciences. For nearly a century past hemlock has been prescribed with the greatest possible caution: it being considered a most potent poison. The symptoms of its action are stated to be vertigo, "inebriation," a pressure on the eye-balls outward, sickness at stomach, and trembling agitation of the muscles. For a time its medicinal application fell into disusage, when it was again

revived and administered to various persons, as the evidence shows, in grand, heroic doses, without doing any harm.

I am not aware that Medical Jurisprudence, before the inquest in Dr. Walker's case, has ever been called upon to investigate poisoning by hemlock. Since the death of Socrates (of which Dr. Walker was prone to speak) four hundred years, and the death of Phocion, three hundred and eighteen years before Christ, hemlock has been deemed a "deadly poison." Toxicological science has so entertained it. The materia medica has always so represented it. Pharmaceutists have always so prepared it. Mr. Harley, and other eminent English toxicologists say that "hemlock is no poison at all." "That common hemlock *is neither a poison, nor even a medical remedy*." That sixty grains were administered to a young woman with no perceptible effects. In the old materia medica *a half-grain* of conium, or three grains of the leaves of hemlock, gradually increased, are the cautious doses recommended. Mr. Harley, after taking twenty-four grains of the pure extract of the juice of the leaves, only experienced muscular numbness, which passed off within an hour.

The *Pall Mall Gazette*, in reference to Mr. Hartley's toxicological experience, says: "The facts relating to Socrates and Phocion may reasonably be explained another way. Dictionaries have always translated the Greek 'Koneion,' and the Latin 'Cicuta,' by the word hemlock. Some change of classification has no doubt occurred; what the ancients called hemlock was not the conium now used in medical practice, but the Cicuta Virosa L, a potent poison," producing violent tremors, vertigo, spasms of the jaw, convulsions, epilepsy, bleeding from the ears, burning in, and swelled stomach, death. The statement made by "Harley and other eminent toxicologists," is certainly confirmed by the evidence of the great heroic doses of conium harmlessly administered to several persons, *including a child only eight years old.* First, "Individuals have been known to take 260 drops"—over a half-ounce. "Harley," (Is this gentleman the eminent toxicologist, or another person of the same name?) "took as high as 540 drops, or one and one-eighth ounces."(!) "In these cases the patients experienced the effects" (were they poisoned?) "and recovered." "Fifty minims of conium were administered to a child only eight years old," (equal to 150 to an adult) "*without producing* any effect. Thirty minutes after, 60 minims more were given." which are equal to 350 minims given to an adult. "A Sing Sing prisoner took 240 drops—a half-ounce—with no serious effect" to any one of them. In Dr. Walker's case it is shown that he took 180

drops of conium in the first instance, like the dose given to the child, without any visible effect whatever. Several hours after he took 150 drops more, together 330 drops, less 20 given to the eight year old child, and less by 210 drops taken by Mr. Harley, who largely recommends its use. "*Beck's Materia Medica*," formerly the text book of the College of Physicians and Surgeons, New York city, says: "The dose requires to be increased, and that more quickly, and to a greater extent than is the case with almost any other substance in the materia medica, so that at length it has been taken to the extent of a number of drachms in the course of a day."

A large difference exists between the pathological condition, "idiosyncracies,"—if the evidence prefer the term—of the brains and nervous system of the persons mentioned, and that of the degenerating, disorganizing brain and its tissues, and the lungs, of Dr. Walker. Functional disorder merely, and organic degeneracy of one or more vital organs, widely differ in results, although the pathognomonic symptoms may be similar. The first is like the spring of a watch too tightly or too loosely wound in its case, thereby, in either instance, impairing its intended function, and causing irregular action; but where it is rusted into, and rusting, it is organically degenerating, its function is gradually destroyed, and the action stops.

Dr. Walker's case, as officially reported, is unique of its kind. It shows, complicated with organic degeneracy of the substance of the brain, its membranes, and some of the arteries, earthy deposits, curdy and fatty tumors, a softening of the substance of the brain, and a "*softening* of the substance of the lungs," without tuberculous degeneracy. His system was prostrated from long continued physical suffering and severe surgical treatment. Since this was coupled with attendant nervous debility, mental and vital prostration, we may be permitted to infer, without the chance of dissent, that his system was prepared for, and subject to collapse at any moment. It is probable that a cup of strong coffee, a glass of liquor, or the loading the stomach with inappropriate food, or any *extra mental excitement* or *prostration*, would have produced the same results as the conium is supposed to have done, by being taken into, and acting upon an empty and exhausted stomach, causing a reflex action on the sensorium.

With this singular complication of the condition of the brain, its membranes, and its blood vessels, and softening of the lungs, all the other parts of the body being in a perfectly healthy condition, and in face of the very many large heroic doses of conium shown to have been

given to several persons, a child eight years old included, without doing any harm, and given with confidence by the several practitioners, the jurors, after stating the quantity of conium the deceased had taken, the gist of their verdict, entirely overlooking, or ignoring altogether the extensive diseased condition of the brain, &c., is, "Moreover, we find from some inappreciable cause *to us unknown*, the medicine acted with *extraordinary potency*. In witness whereof, we, the said jurors, as well as the coroner, have to this fixed our hands." (!) With this logical piece of "crowner's quest law" Dr. Walker's case is disposed of.

New York, 1875.

NEW YORK ODONTOLOGICAL SOCIETY.

The June meeting of the Society was held on Tuesday evening, the 15th, at the residence of the President, Dr. A. L. Northrop, who occupied the chair.

Communications were received from Dr. Garretson, of Philadelphia, and from Mr. Fletcher, of Warrington, Eng.

Dr. Garretson desired to bespeak the favorable consideration of the Society for a book which he has written, entitled "An Analysis of the Nature and Relations of Man," in its scope a continuation of Plato's famous controversy on the "Immortality of the Soul."

Dr. Brockway exhibited a new form of burr, differing from others in being cut like a bastard file. He claimed that it cleared itself more rapidly, and cut faster than the old form.

Dr. Atkinson: I have been experimenting with salicylic acid. I find it equal to creosote in pain-relieving qualities, and free from unpleasant odor. It is readily soluble in alcohol, or alcohol and glycerine, remarkably soluble in ether, and slightly so in water.

It works beautifully in cases of ulcers, either in paste or in solution. It is escharotic in full strength, but does not produce a deep slough, merely a discoloration, the pellicle coming off in a few days. When the powder is laid in a cavity containing saliva, or any mucous substance, it coagulates the albumen, whitening the mucous membrane. Alcoholic solution produces the same effect. It is a fine disinfectant. It was formerly scarce and expensive, but is now produced abundantly from carbolic acid.

Dr. Shepard, of Boston, offered as a pathological specimen, a right superior bicuspid, which had been devitalized when the patient was

twelve years old. It was filled at that time with gold, but so that there was no proper occlusion of the molars. Six years ago the patient came into my hands, all remaining of this tooth being the buccal cusp. The molars having been filed away I refilled them, restoring the contour in order to preserve the incisors. Some molars being wanting on the right side, I used this bicuspid for that purpose. The entire tooth, roots and crown, was restored with gold.

Dr. McManus (Hartford) : A lady came to me complaining of neuralgic pains which had continued for two weeks, commencing periodically about half-past nine. She had for some years suffered from sciatica. Her physician thought this pain neuralgic, and treated with quinine and other nervines, without effect. I found some sensitiveness about one of the lower bicuspids, which was filled with gold. I removed this filling, and think it was perfect. Found the pulp congested, and applied creosote, when the pain ceased. I would like to ask those present if the pain was due to thermal changes, or to nervous derangement ?

Dr. Bogue : I am reminded of a case of my own which is illustrative of the time necessary for a pulp to become dead. A gentleman came to be treated for a right upper molar, the filling in which had been twice removed within two years, to relieve pain, once by Dr. Moffat, of Boston. I removed the filling in the grinding surface, and upon working in the direction of the palatine root he shrank. I supposed I had gone through an opening which I thought might have been drilled there. I put in benzine on a piece of cotton, as a sedative. The next morning he returned, and upon withdrawing the cotton, the palatine pulp accompanied it ; showing that pulp to have been upwards of two years in dying. Meanwhile the buccal roots had abscessed.

Again, one of my neighbors filled a lower molar with amalgam about a month ago. Last Sunday the patient suffered very much, and called on him again ; but not finding him, came to me. I drilled through the top of the tooth, and pus and blood flowed freely. Subsequent examination showed that the anterior root had abscessed, while the pulp in the posterior root was still alive. More than a month had elapsed in this case since the tooth was supposed to be dead.

A paper was received from Dr. Chas R. Butler, of Cleveland, in which he deprecated the generally hasty, incautious, and even imprudent use of anæsthetics in dentistry, comparing the proceedings of dentists in this matter with those of other surgical and medical operators. He said that patients went to a dental operator in a mental and physical

condition different from that in which they sought the doctor or surgeon, and that dentists were wrong in regarding their importunities or objections. That the operator administering anæsthetics should be one competent to judge of the necessity for, and the effects of an anæsthetic in each operation, and who would act inflexibly on his own judgment in the case, with regard only to the good or harm to be done, and not to the desires of the patient. For it had come to be that for the most trivial operations recourse was now had to gas, ether, &c., too often quite without regard to the real necessity or possible bad effects of their use.

He alluded to those practitioners of dentistry who, themselves competent, and yet cautious enough not to administer anæsthetics, would still recommend such agents, directing patients to others to obtain them, and if harm came to the patient from such agents, "would such practitioners assume any responsibility in the case, or would they be the first to furnish the cue for a condemnatory article in some public journal?"

Dr. Butler concluded by claiming that *no* anæsthetic is absolutely safe to use, and that therefore the greatest caution must be exercised in the employment of such agents; that by proper representations, and firmness on the part of the operator, many persons bent on taking gas or ether would be diverted from their intention, and find, on trial, the operation they had dreaded to be really of no moment; and that it devolved on those practitioners who aspired to eminence in their profession, to first understand fully the nature, manner of use, and effects of all anæsthetics, and next, to employ them only in such cases as showed a clear necessity for such agents.

The letter of Dr. Fletcher was then read, and is as follows:

Dear Sir: Will you please lay the following before the New York Odontological Society, in connection with the question of amalgams which has recently been brought under notice.

It is natural that an objection may be taken to the testimony or results of a manufacturer; at the same time I shall, as far as possible, confine myself to questions admitting of easy verification; the conclusions which may be drawn I leave to others. Taking your experiments and tabulating them, I find no necessary agreement between the linear shrinkage and the power of excluding moisture. It is probable, so far as I can see, that some error was caused by the pressure of the spring used to force the pointer up to position, as the measurements given do not agree with my own: at the same time, experiments made in a completely

different manner seem to corroborate the results as a whole on this point.

In the recorded experiments great reliance has apparently been placed on the packing test as originally devised by myself, but I think the conditions of this test have not been fully understood, and the precautions necessary to make it of value have not been taken, and for this reason, I have had doubts as to the results of many who have used it.

Until about a year ago I could not understand why the tube test and the shrinkage test, when taken together, should not give the results which may be obtained in the mouth. If they did so, an amalgam which responds to both satisfactorily, should be a perfect success in the mouth, absolutely without variation. We know well that this is not the case, and I have seen in the mouth, repeatedly, plugs of amalgam which I knew were practically free from contraction, responding (under certain conditions) to both tests, but which, after they had been in the mouth a short time, were completely parted from the edge of the cavity and lifted up above their original level.

With the object of discovering the cause of this, I instituted a series of experiments, taking first an alloy referred to by Mr. Kirby as having an expansion of about 1 in 500, and containing 2 equivalents Silver, 1 equivalent Tin, with 10 per cent. Gold. Of this alloy I made three ingots, with samples of metals from different refiners, one of the ingots being made with chemically pure metals—a condition totally out of the question commercially, owing to the great difficulty and cost of preparing the metals absolutely pure. I verified the expansion of these ingots, and found them nearly alike, any of them having sufficient expansion to burst a weak glass cavity one inch in length. With a sample of filings from each of these ingots I made three plugs in glass cups, each half an inch in diameter, two with no more mercury than necessary (about two-thirds the weight of the filings) the other with equal weights of mercury and filings, as recommended by Mr. Kirby. One of each of these plugs was covered with ink the moment it was finished, and one with the smaller proportion of mercury was left dry for twenty-four hours, and then covered with ink. The plugs which were covered with ink whilst soft, immediately began to ball up and lose their shape, and in less than twenty-four hours the ink had penetrated completely round the plugs down to the bottom. *The plug which had been left dry was a perfect moisture-tight fit.* To prevent error I repeated these experiments several times; in fact, the three ingots referred to were made at different times, to verify the results, which I at first distrusted. On repeating the test in an ivory cavity, with a plug exactly level with the

surface, and immediately placing it in water for a few days, I got an exact copy of the very fault which had so troubled me in the mouth, but strange to say, I could not get it with any of the other alloys which I had been accustomed to see faulty in the mouth. As it was beyond a doubt that the fault in this test was produced by the presence of moisture alone, I commenced packing the samples I desired to fail with in cavities containing water, this time with tangible results. The plugs which were flat and level when finished, had in a few hours or days parted completely from the sides of the cavities, and were distinctly lifted up exactly as I had seen the very same compounds in the mouth. To verify this wet-packing test, and to judge of its real value, I took samples of alloys which I knew from experience stood unchanged, or nearly so in the mouth, and I found the most perfect agreement between the practical results in the mouth, and this test; those alloys which had proved themselves reliable had the power of retaining their shape if packed in a wet cavity and immediately immersed in water.

These results having proved themselves so far, I set to work on my own platinum amalgam, and with some difficulty succeeded in making it stand this test well. From results in the mouth up to the present time it also fully verifies the theory that on an amalgam which will stand the wet-packing test the most absolute reliance can be placed in every case. Of this alloy, in its improved form, I send plugs which have been packed in cavities dry, full of water, and full of ink, the surface in each case having been kept under ink for not less than two months, and I also send a sample of the filings used. I do not place absolute reliance so much on the exact composition of the alloy, which I find in practice may vary considerably in proportions, but on the selection of ingots, by subjecting them to this test along with the other tests I have always used. It may be taken as a safe statement, that all alloys are utterly unreliable in their exact composition and properties, and that if uniform results are to be expected, they require the most careful examination and testing. I average not less than twenty test plugs from each melting, and have taken more than one hundred from one lot of alloy before it could be made satisfactory. Although I clearly acknowledge the impossibility of making alloys absolutely uniform in composition, I take this opportunity of distinctly denying the correctness of one of the assays of my amalgam as published in your report. A correct assay of an alloy of this kind is a very difficult matter, and in my own experience has very rarely been obtained.

PLUGS.—1 in dry cavity; 2 and 3 in water; 4 in ink.

Faithfully yours, THOS. FLETCHER.

Dr. Atkinson: I think the idea of poisonous results from the use of crude mercury in the mouth arises from mistaken diagnoses of cases. I have no evidence that it is possible to bring any agents in contact with proof mercury in the mouth, so as to form a poisonous compound. I think the whole discussion on this subject arises from the general superficial manner of accounting for conditions not easily understood. As to those cases of amalgam fillings, where, though the filling has separated from the dentine, the tooth has still been long preserved, some account for this phenomenon by saying that an oxyde of tin is absorbed by the tooth structure, causing calcification, which prevents decay. There is a great variety in amalgams, and quite as great contradiction in their various analyses. I think little reliance can be placed on such statements.

Dr. Lord: Have you any experience in packing amalgam under moisture?

Dr. Atkinson: Those cavities have, as I understand, succeeded best where there was no special care as to the removal of moisture. In regard to the space between the filling and the tooth-walls, I can conceive that the moisture in the outer stratum of the filling may hold sufficient oxygen to take hold of the tin and produce a hardening of the dental film.

Dr. Bogue: Does Dr. Atkinson express the opinion that this hardening takes place only when the fillings are put in without regard to moisture?

Dr. Atkinson: Yes, sir. I have seen some very careless work in which this was clearly manifested.

Dr. Bogue: Can you say what preparation was used?

Dr. Atkinson: The old Crawcour, which was Spanish quarters filed, and crude mercury rubbed into the amalgam. I paid $50 once for a recipe which was simply filing with a coarse file old Spanish quarters which had some copper. This silver, copper and mercury made very hard fillings.

Dr. Shepard (Boston): I have had the impression that it was the copper, not the oxyd of tin, which had a preservative effect on the tooth tissue. I have seen, in my early practice, many of these fillings of coin silver amalgam. Despite the then generally slovenly and imperfect manner of excavating, these fillings did good service; and on removing them, while perhaps some parts of the cavity would show decay, yet underneath, and to a good extent around the margin, sound tissue would be met. The tooth was generally more or less discolored, and

a very dense texture was a marked accompaniment of this condition. I think a good amalgam filling of coin silver is better than a poor gold filling.

Dr. Fitch: So far as poisonous effects of amalgam are concerned, I have yet to see the first such case. I have found amalgam made from coin silver to be a good preservative, and objectionable only because of discoloration. After all, the crucial test of amalgams is only to be obtained by use in the mouth, the chemical processes and conditions thereof being more reliable as testing mediums than tubes or shrinkage measurers. I find the amalgam of Dr. Kearsing, of Brooklyn, to give excellent results. The surface is well preserved, and the attachment to the walls remains perfect. I believe there are some conditions of the mouth and teeth where amalgam is preferable to anything as a filling, aside from economy.

Dr. Jarvis: I have fought persistently against the use of amalgams; but continued observation has removed my prejudice. From my manner of working with my first amalgam filling, and the succeeding results, I came to the conclusion that amalgam should be packed. We have heard the statement, from the best authority, that amalgams are prepared with a view to no change in the ingredients, and that therefore no mercury should be squeezed out. With this I do not agree; for I do not see the possibility of packing amalgam without bringing more or less of the mercury to the surface. I do not think our conclusions as to amalgams should be drawn from tests in the mouth. I think the experiments at our clinics would be better for being carried on outside the mouth. There are, of course, conditions in the mouth which cannot be reproduced out of it; but mechanical manipulations will be better understood if done outside.

Dr. Hill: I think I understood the gentleman to say, at the last meeting, that it was not necessary to squeeze out mercury.

Dr. Jarvis: The matter had then been discussed, and Dr. Kingsley closed it with the statement that there should be no change in the balance of the materials and composition, to which there was a general assent. When amalgam is mixed, there is a quicker union between some ingredients than between others; for example, mercury with tin than with copper or silver; and when the amalgam is squeezed there must be a change in these ingredients.

Dr. Atkinson: I think that is a mistake, at least as far as concerns the amalgams I am acquainted with. If precipitated silver and tin are referred to, it may be so. The different affinities of the different metals for each other are now provided for by ingoting them.

Dr. Fitch: I referred to results rather than to manipulation. I think that generally the ingredients of amalgams are insufficiently blended by the operator. I spend five or six minutes rubbing amalgam before I introduce it into the teeth. The mercury should entirely dissolve, making the congelation uniform throughout.

Dr. Hill: I understood differently from Dr. Jarvis what was said at the last meeting, I think there was general opposition to Dr. Brockway's idea of malleting, on the ground that it would express too much mercury from the amalgam.

Dr. Jarvis: I endeavored to state that I understood Dr. Kingsley to say that he thought these preparations were expected to remain in their original proportions, and it was generally assented to.

Dr. Bogue: The manufacturers of amalgams in this country, with, I think, one exception, advocate washing amalgam before insertion, after the amalgamation. This is wrong; for, as far as I am able to learn, it is impossible afterward to get rid of the water. Dr. Jarvis asked if any one present is in the habit of inserting amalgam fillings just as they are rubbed up with mercury. Yes; several. I have not squeezed out any mercury for about two years.

Question : You do not pack it ?

Dr. Bogue: Yes. I shall be happy to show you a filling malleted in with the electric mallet. I take a globule of mercury about one-third the size of the cavity. In it I place enough Fletcher's amalgam to make a soft mixture, of which I lay aside a piece. I seldom use the rubber dam, but wipe the cavity well, and sometimes coat it with dissolved gutta percha. A portion of the amalgam is then taken out and laid in my paper and the mass rubbed up until granular—almost non-coherent. The first layer is easily plastered around the cavity. The balance is sometimes so crumbly that I have to pick it up with forceps. The excess of mercury is absorbed, and a good smooth surface obtained. If I use two kinds of amalgam, say Hood's or the Star amalgam, I lay aside enough to fill the cavity half full. The balance I mix with Walker's Excelsior amalgam, which is so coarse as to be hard when mixed. Upon packing and malleting the mercury penetrates these coarse grains and gives a fine surface. I don't mean to say that I can, as a rule, mallet amalgam, for often if I malleted on one side it would drive out on the other. This is the difference between our fillings and the English. They put amalgam into cavities ; we build up with it. In regard to the alleged injurious effects of amalgam fillings, I desire to repeat what an eminent physician, Prof. John T. Metcalf, of the Col-

lege of Physicians and Surgeons, said recently in that regard. After carefully examining the subject, he said that undoubtedly the objection to amalgam has been mainly from prejudice, and that he could really discover no sound reason for supposing it to be unhealthful. If I am not right in this statement, Dr. Woodward will correct me.

Dr. Woodward: That was what he did say to me.

Dr. Hill: Speaking of the manner of conducting experiments, I believe we can secure as valuable results outside the mouth as in it. There may be a difference in the mechanical manipulation of amalgam inside and outside the mouth. There may be a considerable difference in the solidity of the teeth.

Dr. Kingsley: I would say a word in regard to washing amalgams in order to get rid of the oxyds that cause discoloration. We are recommended to use different fluids, and every dentist has his own way of expressing the most coloring. This is absurd; for with water, a piece of soap, and sufficient rubbing, I will reduce the whole of any amalgam to coloring matter. There has been some reference to statements I made at the last meeting. I understood that the best method of mixing amalgams, was to take a suitable quantity of mercury and add the metal prepared until as stiff as could be used in the cavity.

Adjourned.

SOME OF THE PROPERTIES OF AMALGAMS.

SHRINKAGE.

Read by MR. BROWNLEY, before the London Odonto-Chirurgical Society.

The diversity of opinion in regard to some of the properties of Amalgam which seemed to prevail when, on a former occasion, the subject was under discussion, suggested to my mind certain experiments by which a knowledge of at least some of its properties might be arrived at.

Out of the mouth it is all but impossible to subject a specimen of amalgam to any test or series of tests equivalent to the varying conditions in it, such as changes of temperature, extending over a length of time; changes in the chemical condition of the saliva, in health and in disease, and many others. In addition to this, any attempt at investigation is complicated and rendered still more difficult by the many forms of amalgam now in use, and the different modes of working them;

and all of which are esteemed by some because of their superior excellence in most of the properties considered by the operator to be essential. For the most part these preferences are mere matters of opinion. The form prescribed by one as all but perfect, may immediately thereafter be condemned utterly by another.

That such diverse opinions should be entertained by men whose attainments warrant their being heard on the subject, seemed to indicate that something might be learned from a study of the various qualities inherent in different forms of amalgam, and by comparison of the results so obtained.

In such an examination, the chemistry of the subject may, for the present, fairly be excluded. Not that I question the possibility of chemical or even voltaic action causing the failure of a filling ; I merely wish to limit the present inquiry, and to ascertain, if possible, to what extent the failure of amalgam as a filling for decaying teeth, may be due to causes other than chemical. I may state in passing, however, that it has long been my opinion that too much has been expected by way of explanation from the chemistry of the subject. The chemical combination, *i. e.*, supposing chemical combination does take place in the hardening of amalgam, is evidently of the weakest, and moreover it remains to be demonstrated what this chemical change is.

All of the following tests were applied out of the mouth, but the chemistry of the subject being excluded for the present, the remaining suspected sources of change are such as can for the most part be as easily observed out of the mouth as in it. Excepting, then, changes due to chemical action, it remains to inquire, What are the other causes of failure as a filling inherent in this material? Filled into the tooth in various conditions, from the almost dry powder of some operators to the soft and plastic compound of others, does the molecular change we speak of as *hardening* involve other changes which are or may become sources of failure under those different modes of procedure? In this particular direction the application of some, or, indeed, most of the tests *out* of the mouth will be of great advantage, inasmuch as the proportions of the metals, and also the quantity of the amalgam used, may be varied to any extent, and thus, by exaggerating the conditions, the special effects sought for will be rendered more apparent.

As a filling for decaying teeth, a perfect form of amalgam would be one in which no change of bulk occurred in hardening—one capable of bearing without change the extremes of temperature to which it might be exposed in the mouth ; of sustaining uninjured the pressure

and friction of mastication, and incapable of absorbing the fluids of the mouth, or of being changed by them. To this list other requirements might be added, but it will be generally admitted that no form of amalgam can be esteemed perfect which does not possess at least *all* of the qualities enumerated. Most of the amalgams now in use approach this standard, but while good results have been obtained with nearly all of them, failure also with every form is sufficiently frequent to make it of importance to determine, if possible, to what extent those untoward results are capable of being avoided, by a knowledge of the properties inherent in the material itself.

The greater part of the amalgams now in use are supplied to us in the form of an alloy, requiring only the addition of mercury to form them into a paste. More or less of this metal is employed according to directions, or as the operator may think fit, so that at the outset we have to ascertain what proportion of mercury gives, for our purpose, the best result. With nearly all forms, instructions are given as to the quantity of mercury to be used in their preparation. With the amalgams in the form they are now provided for us, it would be the easiest thing in the word for the manufacturers to give the exact proportion *by weight* of mercury to be used ; nevertheless, it is a significant fact that only one of them has ventured to give us the proportions which give with his preparations the best results. The main feature in all the manufacturers' recommendations is a "small quantity of mercury."

One more daring than the rest has asserted that mercury once added to most amalgams cannot be again separated without injuring them. This, however, is mere assertion ; no evidence, so far as I am aware, ever having been supplied by him in support of this statement. If necessary, it will be easy to show that there is not one of the forms of amalgam to be referred to presently—no matter what quantity of mercury may have been used in its preparation—in which the mercury cannot be induced to travel through the specimen, and be made to appear in greater proportion at one point than at another. Consequently there cannot—in practice—be any such thing as a perfectly uniform condition throughout the same filling. Different parts of it will be amalgamated in different proportions, and that part which has more than the other will be no worse off in being reduced to the same condition. Assuming, however, that in following the directions of those who make the amalgam we are using the form supplied by them to the greatest advantage, we may proceed to test the effect of a greater or less quantity of mercury by making up one form of amalgam with mercury

in various fixed proportions. For this purpose the most convenient form, "Sullivan's" (Cu. cum Hg.) was employed, and a sufficient quantity of it was made in the usual way. The mode in which this form is prepared and kept for use rendered it necessary that some check on our operations be used. No one who has had any experience in testing this form of amalgam would be disposed to place much reliance upon appearances, or on proportions effected merely by weight. To determine, therefore, with accuracy, the proportions of the metals, specimens were set apart, and in every case the specific gravity was ascertained.

In the course of these proceedings the specific gravity was taken at first (to save time) before the specimen had been allowed to set. The consequence was that much time was lost in verifying weighings, which could not be made sufficiently to correspond. On one occasion, having accurately weighed a piece of unhardened amalgam, I was called away, leaving the specimen hanging in the water, and was unable to return to the subject till the following day. The difference in the weight then apparent suggested the probability, which experiment afterwards made clear, that a change of specific gravity takes place in the hardening of amalgam. As an instance of the extent of this change, a specimen which in its soft state gave 11.95, became, on hardening, 11.58. Subsequently the amalgam was in every case allowed to harden before the specific gravity was ascertained.

With the view of determining to what extent Hg. might be combined with Cu., and yet result in a hardened amalgam, several preliminary trials were made. The maximum quantity of mercury was reached when an equal weight had been added to "Sullivan's" in its ordinary form. Beyond this, as will be seen by one of the specimens, the amalgam has not hardened, but has retained the brilliant appearance of mercury in its liquid state, although a tendency to harden is quite manifest. With an equal weight of mercury added, the amalgam has set, the brilliant surface is gone, and the mass has assumed all the appearance of hardened amalgam. Such a form possesses little strength, and the heat of the hand is generally sufficient to restore it to its almost liquid state, even after standing for months; but it is sufficiently set to answer the purpose, viz., to render more apparent the special effects produced by what has been termed an excess of mercury.

To Sullivan's amalgam mercury was added in five different proportions. These five specimens may be described as very dry, dry, medium, soft, and very soft. The "very dry" was obtained by con-

tinuous manipulation and pressure in the hand, then between the blades of a pair of pliers, the specimen being contained in a piece of leather. The "dry" was rendered so by pressure in the hand only; no mercury was expressed from the "medium." The "soft" had half its weight, and the "very soft" an equal weight of mercury added. The following figures give the average specific gravity of each.

The very dry	10.66
" dry	11.05
" medium	11.67
" soft	12.18
" very soft	12.85

Hg. being 13.59 and Cu. 8.93.

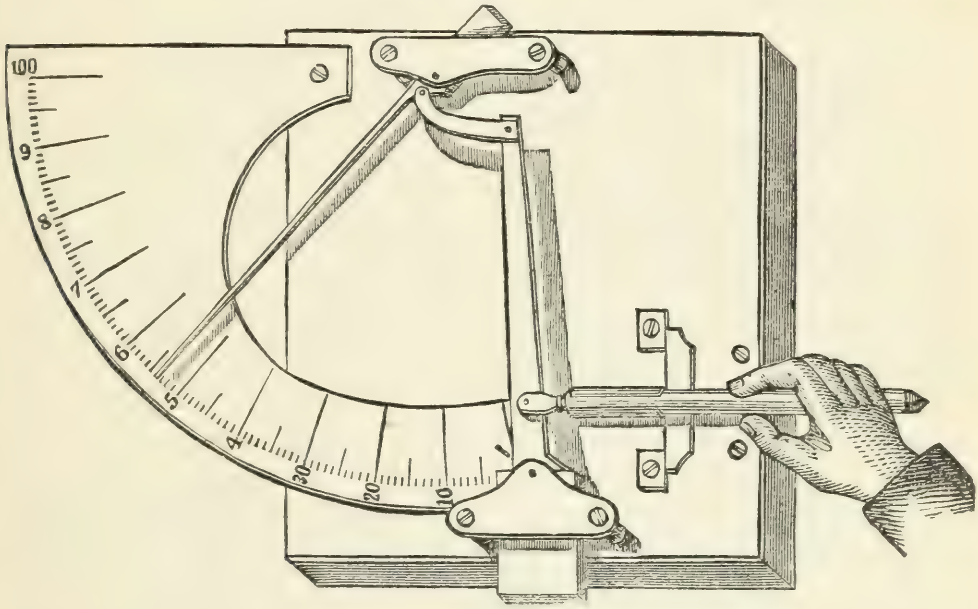
As the presence of what is termed an excess of mercury is very generally believed to be the cause of lessened bulk in an amalgam when hard, and as this is a point of the utmost importance, the first subject of inquiry was

SHRINKAGE.

Glass tubes of from six to eight inches in length, and of about one-eighth of an inch inside diameter, were closed at one end, by heating the glass until it became solid. The tubes were then filled with four of the forms. It was found impracticable to apply this test to the "very dry" form. The amalgam was introduced in small pieces, and rendered solid by tapping the closed end of the tube on a pad, care being observed to keep the mass from which the specimen was being taken in an uniform condition. The tubes were then set aside, resting on their closed ends, to allow the specimens to harden. Under these conditions, it was thought any change in bulk would take effect at the mouth of the tube. On hardening, two of them, the "dry" and the "medium," showed no change; the other two had shrunk, the "soft" to the extent of one in five hundred, the "very soft" to one in two hundred.

The extent of the shrinkage in the two latter, although quite apparent to the eye, could not be measured to any degree of nicety by any instrument or appliance with which I was acquainted. It was necessary, therefore, to devise an instrument for this purpose. Two or three forms were tried; the one which proved most reliable I have brought before you. It consists of two levers, the first giving motion to the second, together with a graduated scale, to register the extent of the movement of the second, or indicator. The levers have counterpoises attached; they are arranged to work with the least possible friction, and the whole is mounted on a stout piece of hard wood, to give it stability. The distance from the fulcrum to that point of the *first* lever which is

brought into connection with the specimen under examination, is *one fifth* of its whole length; consequently, any movement imparted by the specimen will be five times greater at the free end of the lever. The distance on the *second* lever from the fulcrum to the point at which the free end of the first lever is connected with it, is *one twentieth* of its whole length, so that any movement imparted to it by the free end of the first lever will thus be twenty times greater at its free end, under which the graduated scale is placed. Thus, then, the movement, increased five times by the first lever, is communicated to the second, or indicator, to be again increased by it twenty times; so that between the two the whole extent of the increased movement shown by the indicator is five times twenty, or one hundred times greater than the degree of movement imparted by the specimen to the first lever, at the point when, by means of a suitable connection, it is brought to bear upon it.



As the specimens to be examined were of unequal length, some means of measuring them was necessary. A scale, the degrees of which correspond to the extent of the motion possessed by the part of the first lever on which the specimen bears, was obtained by means of the instrument itself. This, the straight line, bears the same relation to the curved one that the first lever, at the point it connects with the specimen, does to the free end of the second lever, or indicator. The one progresses in whole numbers or hundreds, the other in parts of a hundred or units. Each degree of the straight scale represents one hundred, each degree of the curved scale an unit of this hundred.

The instrument is used by placing the specimen in a frame made to receive it. When in position it may be moved to either side, but cannot be advanced towards the first lever under which it is placed, nor can the specimen be advanced beyond a fixed point in the frame. The connecting rod is allowed to rest, in the first instance, on the glass. If the end of the tube has been ground at right angles to its length, the figure indicated is the one wanted. If, on turning the tube round, the indicator move, then the mean of such movement gives the figure sought for. The frame is then moved aside, so that the end of the connecting rod may fall on the centre of the amalgam. The number of degrees through which the indicator has traveled, from the point already noted to its present position, is the extent to which the specimen has shrunk. For the other figure in the statement, it is only necessary to measure the specimen on the straight scale, which gives the number of hundreds, in which shrinkage to the extent of so many parts of a hundred, as shown on the curved scale, has taken place.

As the term degree conveys no idea of the delicacy of the movement possessed by this micrometer apart from the instrument itself, I may add that each degree of the straight scale measures about one fourteenth of an inch. This is divided by the curved scale into 100°, each of which will therefore be $\frac{1}{1400}$th of an inch, and those degrees being quite capable of subdivision by the eye into halves and quarters, we are thus able to render quite apparent to the eye a movement of less than $\frac{1}{5000}$th part of an inch.

To return to the four specimens of amalgam under consideration:— So little change in the two, and none at all in the other two, led to the suspicion that the straitness of the tubes had prevented free action throughout their entire length. It was found that on gently tapping the closed ends of other tubes so filled, after they had stood some time, a still further shrinkage could be obtained. Quarter-inch tubes of about six inches in length were closed at one end, filled, and their contents allowed to harden. The increased diameter, and also an increase in the weight of the tube used, rendered it possible to subject the "very dry" form to this test also. At the end of twenty-four hours only one of them, the "dry," showed no shrinkage. The others had gone down—

The very soft	1 in 260
" soft	1 " 367
" medium	1 " 420
" very dry	1 " 800

A careful examination, however, along the length of the tubes, led to the suspicion that even with so wide tubes those results could hardly

be esteemed conclusive. It was observed that shrinking commenced very soon after the specimen had been set aside, and bearing in mind how little tenacious partially hardened amalgam is, it was thought the friction, and possibly some slight inequality in the bore of the tubes, had to some extent interfered with the results in this case also. An attempt was therefore made, by allowing specimens to drop gently on their closed ends from time to time while hardening, to settle the amalgam solidly down into the tube, so that the whole extent of the shrinkage might be made apparent at the mouth of the tube, which had been ground smooth for the purpose. Under this treatment they went down—

The very soft to	1 in 100
" soft	1 " 185
" medium	1 " 260
" dry	1 " 670
" very dry	1 " 880

With regard to the first of these the result given was not altogether due to shrinkage. The greatest possible care was needed to prevent the almost liquid amalgam escaping at the mouth of the tube; still some loss did occur. Mercury in the form of minute globules was found lying about on the bench after each attempt to condense it; so that, while the figures given are the result of measurement, the actual shrinkage was most probably much the same as the specimen, which had only half its weight of mercury added, or about 1 in 180.

These figures might at first sight be held as showing that the amount of shrinkage is in direct proportion to the quantity of mercury present in the specimen. A more critical examination, however, will show that there is nothing to warrant such a conclusion. The figures represent only the amount of shrinkage apparent at the mouth of each tube. It will be observed on looking along the length of the "very dry" specimen that several breaks are distinctly visible. It was filled into the tube very much in the form of a powder, and beaten down solid with a mallet. Cohesion in such an amalgam must necessarily be very slight, and in shrinking it has parted into several pieces. In the others possessing more mercury no such breaks are visible. If, then, we take into consideration the spaces along the length of the "very dry" specimen—even such of them only as are distinctly marked—instead of showing a better result from having been made to dry, we must set aside the result given above, and substitute for it figures similar to those representing the shrinkage of the "medium" specimen, about 1 in 300, and must come to the conclusion that in respect of shrinkage we have not in the least improved the condition of this form of the amalgam over that in which it is commonly obtained for use.

That which has occurred so markedly in the "very dry" specimen has also, I believe, occurred in a more modified form in the "dry," the same want of cohesion having in this case produced, not fracture, but a much more open texture or porous condition. As I propose, however, as time and opportunity may permit, to make this one of the subjects of future investigation, it is sufficient to note here that in every case the specimens have given sufficient evidence of having shrunk, and that in expressing as much of the mercury as could be got rid of we have not succeeded in attaining to the object in view, while in so doing we have obtained evidence that we have in another direction materially interfered with the value of the amalgam as a filling for decayed teeth. A result so adverse to our traditions in regard to the working of amalgam required careful and thorough examination, but all further tests have failed to throw any doubt on the accuracy of the conclusion arrived at, viz., that the settlement of the question regarding the proportion of mercury to be employed must rest on other considerations than that of shrinkage, *per se*, seeing that in every instance the specimens have shrunk, and that we have obtained a clear indication that the extent of the shrinkage *is not* materially influenced by the quantity of mercury present in the specimen.

In thus confining our attention to the form Cu. cum Hg. we have proceeded upon the assumption, *ab uno disce omnes*, that there are qualities which are inherent in, and common to, all forms of amalgam ; that the differences which give to each its distinctive characteristics are differences in degree ; and that the results obtained from any one form may, in regard to many of its qualities, be esteemed representative of this whole class of compounds. So far no evidence has been obtained against this assumption. We have, indeed, the statements made by some manufacturers, but manufacturers' statements are not evidence, and cannot always be relied on, as we shall presently see.

Before proceeding to another department of this inquiry, it was desirable to ascertain if there are any of those other forms of amalgam which are much more extensively used, and certainly much more highly commended than the form we have been subjecting to investigation, which are capable of enduring this test without change. Samples were obtained of the amalgams supplied by Messrs. Ash, Hallam, Jamieson, Lemale, Smale, Jones, Davis (patent), and Fletcher. Several forms are supplied by the same maker in some instances, but only those described by them as their *best* form were selected for examination, with one exception. The tubes were filled, following as closely as possible the directions supplied with each. From being flush with the mouth

of the tube they have, in every instance, shrunk within the tube in hardening. Taking the length of the tubes into consideration, the extent to which they have each shrunk is very much the same.

This uniform lessening of bulk in amalgams which, in this respect, were supposed to be neutral, naturally excited one's curiosity to know what result would be obtained by the only expanding form of amalgam in the market under this test. A quantity of Fletcher's expanding amalgam was therefore added to the number. For an expanding amalgam the result is somewhat remarkable, viz., shrinkage to the extent of 1 in 125, or about twice the extent shown by "Sullivan's" in its "medium" form. Lest there might be error somewhere, and anxious to do the utmost justice to a form of amalgam which I had come to consider highly desirable, a second sample, larger than the first, was tested with precisely the same result.

As I have no intention of investing further in this "expanding" amalgam, either for use or testing, we may now dispose of it altogether by remarking that, while it certainly possesses the property claimed for it, that "it works as soft as modeling clay," it has also this other property of clay—it sticks tenaciously, when soft, to everything it may come into contact with, so that the mortar in which it is made up, the fingers, instruments, in short, everything it touches, become coated with this mercurial clay, and that to an extent so great as to make it one of the most objectionable forms of amalgam I have yet handled.

Those specimens I have brought before you for examination; to each of them the maker's name is attached.

Though the results obtained in this particular direction throw some degree of light on the subject, there is much more remains to be done before we can speak definitely on the merits or demerits of the various forms of amalgam. Some points of interest, however, have been raised, which may as well be considered now. Amalgam in various forms has been in use as a filling for decayed teeth for a great length of time, and has been found to answer the purpose well, in some instances, for very many years. No one will be disposed to affirm that those fillings which have stood the test of many years' wear in the mouth were done with a form of amalgam free from shrinkage. All the older forms have been laid aside for newer and better ones. Since the best we have at present are not free from change in hardening, it would be unreasonable to suppose that those laid aside as inferior were free from this quality; and yet they have answered well for many years. In the conduct of the amalgams under the tests which have just been detailed, we have, I believe, some explanation of the subject.

It will be remembered that when tubes of one-eighth of an inch diameter were used, two of the four showed no change, although the length of the tubes was from eight to nine inches. In this instance no effort was made to render the suspected shrinkage apparent at the mouth of the tube. Subsequently tubes of quarter-inch diameter were filled and set aside, and were also left at rest till hard. In the wider tubes four of the five forms of amalgam shrank. As neither of the specimens in the small tubes, nor the one in the larger which did not shrink, showed any break or irregularity along their whole length, it was inferred that shrinkage might take effect in two ways: first, by contraction or shortening of the length of the specimen; and (this being in some way prevented) second, by a more open texture or porous condition, either equally throughout the whole length of the specimen or chiefly at some particular part of it, the length of the specimen remaining the same. That this inference was correct was, I think, fully established by the results obtained when a means of insuring shrinkage by contraction or shortening was had recourse to. Clearly some other and more powerful influence was at work to prevent the amalgam going down into those two narrow tubes; it might be the narrowness of the tubes or some irregularity in the bore, very likely both; but when such a result is obtained in a glass tube, how much more, then, in the cavity of a tooth, the walls of which have been purposely left rough and uneven to retain the filling in its place. If we admit the possibility of shrinkage taking effect throughout the substance or texture of the amalgam without change of bulk, there is no difficulty in understanding the occurrence of a good result in one case and failure in another, each of which looked quite likely to succeed. We have only to suppose that the shape of the cavity has determined the nature of the change—that in the one there was general decrease of bulk; in the other a less degree of density, but no change in bulk. Further, as it is in many cases sufficient to exclude moisture in order to save a tooth if the mouth of the cavity be completely closed, it is of little consequence, in this view of the matter, that the shrinkage should have carried the filling off from the floor of the cavity, or from its walls, at a point lower down than would admit the moisture.

Without further evidence, the spontaneous fracture of the "very dry" specimen would admit of explanation also on the supposition that in squeezing out so much of the Hg. we had gone beyond the point to which Hg. may be expressed with advantage. At a further stage in our work, however, other specimens than the "very dry" were found to have broken spontaneously. Amongst the specimens on the table there

is one of "medium," which was first filled into a tube and allowed to harden; the tube having got broken, it was re-softened and filled into its present tube, where it will be seen to be broken quite through in two places.

In another of the specimens I have brought before you we have a very good example of another way in which a successful result may be accounted for. The amalgam was first filled into another tube, which got broken after it had been filled for a time. The amalgam had already shrunk to quite as great, if not greater extent, than is apparent now; but as it was still in a fit condition to be worked, it was immediately filled into its present tube, so that the shrinkage shown here is only a part of what has actually taken place. It was once said of a man in my hearing that he was in the habit of making up as much amalgam in the morning as would serve him all day. In view of this last, and one other specimen, I have no hesitation in pronouncing in favor of at least allowing the amalgam to stand as long as possible (without detriment to its working) between the time of preparing it and filling it into the tooth. The other specimen just referred to is one of Sullivan's, which, in the form described as "medium," was filled into a tube till it was almost full, and a small cap of platinum was then placed, resting on the amalgam and within the tube. The specimen was then placed on the instrument already described, and securely fastened in such a position as would enable us to ascertain the rate of shrinkage through a given length of time; a slight spring was used to keep the instrument in connection with the receding amalgam; no effort was made to induce shrinkage by shortening, but by rapping on the bench on which the instrument stood, a degree of vibration was imparted to it sufficient to overcome any stoppage through friction and the very slow and slight movement expected. The extent of the change was noted at first each quarter of an hour, and afterwards at longer intervals.

1. Actual rate of shrinkage.

During 1st quarter of an hour	2°	= 3°	= 4°
" 2nd "	1°		
" 3rd "	.5°	= 1°	
" 4th "	.5°		
" 5th "	—	= .5°	= 1.5°
" 6th "	.5°		
" 7th "	.5°	= 1°	
" 8th "	.5°		
" 9th "	.25°	= .75°	=1.25°
" 10th "	.5°		
" 11th "	.25°	= .5°	
" 12th "	.25°		
From 3rd to 5th hour	.25°		

2. Average rate of shrinkage.

1°	= 1.6°	= 3.91°
.6°		
.5°	= 1.25°	
.75°		
.5°	= .875°	=1.666°
.375°		
.416°	= .791°	
.375°		
.25°	= .75°	=1.375°
.5°		
.25°	= .625°	
.375°		

These tables represent:—the first, the actual rate of shrinkage which occurred in one specimen; the second, the average of three specimens.

It will be seen at a glance, from those two tables, that if we can allow an amalgam to stand for one third the time it takes to set before filling it into the cavity, we will by so doing reduce the shrinkage which takes place in that amalgam by something over one-half its extent.

I am not prepared to assert that any amalgam may be allowed to set to the extent of one-third the time needed for complete hardening, and then be filled into the cavity, to be as perfect a filling, in all other respects, as if it had been filled into the tooth as soon as made. To those who think with me, however, that most amalgams will bear such treatment perfectly well, I submit this method as an effectual way of lessening one of the most hurtful properties an amalgam can possess, and from which none are free.

In passing from this part of the subject we may conclude this paper by referring briefly to the ordinary modes of testing. In testing for shrinkage the plan commonly followed has been to operate on a quantity of amalgam, something like what is needed to fill a large cavity. Compared with such tests, those I have just detailed are undoubtedly severe. That they are too much so can hardly be a charge against them, if we consider the circumstances under which the amalgam has to fulfill its office in the mouth; conditions, be it remarked, which are in no way taken into consideration in the former tests, nor is there any allowance made for them. A cavity in a tooth, piece of ivory, or glass, is filled with the amalgam, and then placed in ink, or some other coloring matter. If on examination this coloring fluid has not stained the interior of the cavity (or amalgam in the case of a glass tube), the specimen is said to be free from shrinkage. One might be more in accordance with truth, and still do ample justice to such a test, in saying that it had simply failed in showing any. Even without the information we have acquired in the course of our proceedings, such a mode of testing cannot be esteemed satisfactory. Setting aside the difficulty of knowing rightly what the result is when the experiment has been performed, and supposing amalgam to be much more sensitive to coloring matter than it is, and that such forces as are at work in the mouth had been brought into play to ensure the entrance of the coloring matter into any crevice that might have occurred, the result would only determine whether shrinkage had taken effect at a point to which the coloring matter could have access. With a tolerably fair specimen of amalgam the whole shrinkage likely to take place would be something like $\frac{1}{2000}$th

of an inch, a movement by far too minute to be readily detected in such an off-hand way. It is no part of my purpose to enter upon a course of experiment from which nothing certain can be looked for ; but if we may judge from the small extent of shrinkage which we have been able to show occurring in all forms of amalgam, even that which has shrunk to the greatest extent would, I believe, give quite as good a result under such a test as the best of them.

BROMINE.

We have been kindly furnished with some interesting facts as to the manufacture of bromine by two of the largest producers in this country, and from their communications we extract the following :

Bromine was manufactured in the United States as early as 1846, by Dr. David Alter, of Freeport, Pa., who continued the manufacture until about 1856. During this time bromine, in its compounds, had been used principally for daguerreotyping. When this method for taking pictures was succeeded by the ambrotype method, the demand for bromine decreased and soon became insufficient to the encouragement of home manufacture, and in consequence the production ceased.

It was not until 1866, when the alkaline bromides, as means to relieve sleeplessness and nervous excitability, had been introduced to and adopted by the medical profession, that the manufacture of bromine in the United States was resumed.

Again it was the mother-liquor or bittern from salt works on the Alleghany river, this time at Natrona and Tarentum, which furnished the bromine. In 1868, the demand increased rapidly, and soon exceeded the production from the Pennsylvania salines. Other sources were looked for and found in the Ohio river and Kanahwa salt regions. In the early spring of 1868, the first factory in this locality was erected at Pomeroy, utilizing the bitter water from the extensive salt works—the Dabney furnace. Since then factories have sprung up at all the largest salt furnaces, both in Ohio and West Virginia, now the principal seat for the manufacture in the United States.

The preparation of bromine is conducted as follows : The bittern or mother-liquor from the brine, after all the salts separable by crystallization have been removed, contains the bromine in combination with certain metallic bases, such as magnesium and calcium.

Acted upon by sulphuric acid, the bromine is displaced from its com-

bination in the form of hydro-bromic acid, which, with the oxygen generated from binoxide manganese, chlorate of potash, chromate of potash, etc., and sulphuric acid, yields bromine and water.

The bromine is liberated as a gas by means of heat applied to the contents of the distilling retort; the gas is evolved and escapes from the retort through a leaden or earthen-ware cooler, in which it condenses to a liquid, and as such discharges into the receiver.

The distilling retort is generally a sand-stone vessel, holding from 100 to 300 gallons. Dr. Alter, in his first experiments, used earthenware made with a mixture of pulverized coke. Other material has been proposed and used, such as fire-clay, wood, and lead.

The following figures will show the increase of production from 1867 to 1873:

Estimated Yearly Production.

In 1867	10,000 to 15,000	pounds.
In 1868	35,000 to 40,000	"
In 1869	65,000 to 70,000	"
In 1870	100,000 to 110,000	"
In 1871	125,000 to 130,000	"
In 1872	160,000 to 165,000	"
In 1873	170,000 to 175,000	"

Until 1870, the total production was consumed in the United States. In that year the first parcel was exported to Germany. Since then, more or less, every year, finds its way to the European market. Of late the production has far exceeded the demand.

Over-production has so depressed prices that there is very little encouragement for those already engaged in the business, and no inducement for manufacturers to start additional factories, as may be inferred from the following particulars given by one of our correspondents:

"At this period the business had passed into the hands of so many that it was feared it was entirely ruined, and to prevent further spread, I erected an extensive factory on the Kanahwa river, seventy-five miles distant from this point, for the purpose of making the bittern of this valley tributary to my business. My business now includes large factories at the Valley City Furnace, Hartford City, West Virginia; at the German Furnace, Germany, West Virginia; at the Hope Furnace, Mason City, West Virginia; at the Snow Hill Furnace, Kanahwa, West Virginia.

"The basin of the Ohio is eight miles wide, and on it are located the above-named furnaces. From the bittern of this district, and not from

any other, can pure bromine be made at a price that will compare with present rates, as you are aware the manufacturers at Saginaw river and other Western points have suspended operations and torn down their factories.

"The Kanahwa basin is a continuation of the Ohio basin, dipping with the coal in an easterly direction. In the manufacture we boil the bittern (or refuse water after extracting the salt) in iron pans, then transfer it to stone or fire-clay stills, and treat it with sulphuric acid, chlorate of potash, or manganese, and by means of coolers and other apparatus extract the bromine.

"When in full operation there are:

4 factories	producing	say.....	75,000	pounds	per year.
1 factory	"	"	25,000	"	"
1 "	"	"	15,000	"	"
1 "	"	"	7,000	"	"
4 factories	"	"	100,000	"	"

"It is likely that next year these factories will not be worked up to more than one-half or two-thirds capacity, on account of over-production of salt."

Present prices are very low for bromine and its preparations, and manufacturers have had only unsatisfactory results for some time past. When we consider the current quotations for bromine and bromides, and contrast them with the rates of ten or fifteen years ago, we have a very good illustration of domestic competition reducing profits to mere nominal figures. At present, bromine and the preparations of bromine are selling at very little advance over cost.—*Phila. Drug Exchange.*

ARTIFICIAL BUTTER.

When the methods for the manufacture of butter from beef-suet were first proposed, we gave a detailed description of them. Already several large factories have been established for the manufacture of this commodity, and it has been found to meet, in a satisfactory way, a decided need. So long as there is no attempt at deception in the disposal of the manufactured butter in place of the genuine article, we see no reason for condemning its use, since it is, in fact, only a more pleasing form of suet, from which certain distasteful ingredients have been removed. As was natural, however, the dealers in genuine butter have much fault

to find with its proposed substitute, *butterine*, and the judgment of chemists has been sought with a view to discourage its use. The question is certainly one of great importance to both dairymen and consumers, for which reason we are prompted to give the full report on the subject as prepared for the *Chemical News*, by Dr. J. Campbell Brown. It will be observed that certain of the tests here given are so simple that an intelligent housewife need have little fear of being imposed upon. The report is as follows: "Its general appearance, taste, and consistence are very similar to those of ordinary butter; but, notwithstanding that its solidifying point is lower than that of some butters, it retains much of the peculiar crumbly texture and fracture of dripping. . . . It softens at 78° Fahrenheit, and melts at 86°; when heated and slowly cooled, it obscures the thermometer at 62° and solidifies at 60°. It contains:

Water	11.25 to	8.5
Salt	1.03 to	5.5
Curd	0.57 to	0.6
Fat	87.15 to	85.4
Coloring Matter	——	——
	100.00	

The fat consists of oleine, palmitin, margarine (?), a trace of stearine, and about five or six per cent. of butter. When dissolved in about four times its weight of ether, and allowed to evaporate spontaneously, it does not deposit any fat until more than half of the ether has passed off, and, if the temperature is not below 60°, the deposit is not solid. The first deposit, when dried, fuses at 108°; the second deposit fuses at 88°, and solidifies at 64°. Under the microscope, butterine does not appear to consist of acicular crystals of fat, but of irregular masses, containing a few butter-globules, particles of curd, and crystals of salt. With polarized light, the irregular crystalline structure is beautifully seen, and is clearly distinguishable from butter which has been melted and recongealed. When old and rancid, it acquires the odor and taste of dripping, but it keeps longer undecomposed than butter. When fresh, it is a wholesome substitute for real butter, and if not brought into the market as butter, no one can reasonably take exception to its sale. Butterine may be detected by the following characters: 1. Its crumbly fracture; 2. Its loss of color when kept melted for a short time at 212°; 3. The behavior of its ethereal solution; 4. Its action on polarized light."—*Druggists' Circular and Chemical Gazette.*

CIRCULAR.

Nearly a quarter of a century has passed since Horace Wells, the discoverer of Anæsthesia — a safe, speedy, and effectual means of abolishing sensibility and consciousness—died.

No monument has yet been erected to perpetuate the memory of Dr. Wells, or, in connection with his name, to commemorate this wonderful discovery. He gave most willingly and cheerfully, wishing it, in his own words, to be "free as air," the use of this boon to humanity; asking of his fellow-men, in return, nothing beyond the proper appreciation of its worth, and the honor that justly belonged to the discoverer. As its importance became more widely known, and the world learned by experience the amazing value of the discovery, the feeling was naturally awakened that some positive movement should be made towards the accomplishment of this long-delayed duty.

Entertaining this sentiment, doubtless, the Legislature of Connecticut, some two years ago, appropriated five thousand dollars ($5000) for this purpose, and the city of Hartford a like sum ; and, under the direction of a committee, a colossal statue in bronze of Dr. Wells has been executed by Truman H. Bartlett, Esq., and will soon be ready for erection on some commanding site in the beautiful Park in the city of Hartford, where the discoverer lived, where the grand idea which was to embalm his name and memory in the hearts of his fellow-men everywhere, had its birth, and where his remains now rest.

It is upon the Pedestal, which should be also of bronze, and its ornamentation, that any further funds will need to be expended. This will admit of high and costly adornment, in bas-reliefs, in inscriptions, etc., suited to exemplify the uses of the discovery, at the same time that it commemorates the discoverer ; and we are informed by the most competent judges, will admit of large outlay without transcending the limits of a severe and correct taste.

In view of this circumstance, and of the fact, also, that as the subject has been more freely canvassed, an earnest desire has been expressed in many quarters, both in and out of the State, to take part in this undertaking, it has been thought to be expedient, for the purpose of gratifying this wish, and in order to make the work itself more nearly represent the character and value of the service rendered to mankind by Dr. Wells, to receive such subscriptions from physicians and dentists abroad, and through their agency from the public, in the various parts of the country, as they may feel disposed to make. Our appeal is made primarily to the medical faculty and dental profession, not so much because they have a higher personal interest in the subject than others,

but because they, of all men, best know the inestimable value of this discovery to the race.

The committee who submit the foregoing, represent the Medical and Dental Societies of Hartford, and, in so far as our object shall meet the views of our brethren elsewhere, we respectfully ask from them such friendly aid pecuniarily, as they may think proper to give us, and especially that they take such measures to bring the subject to the notice of their friends, and the public, as, in their wisdom, they shall consider most likely to receive a favorable response.

Letters of inquiry may be addressed to Dr. E. K. Hunt, Chairman of the Committee of the Hartford Medical Society. Subscriptions may be forwarded to Dr. G. W. Russell, Treasurer, Hartford, Conn.

E. K. HUNT, M.D.,
M. STORRS, M.D.
JAS. CAMPBELL, JR., M.D., } Committee of the Hartford Medical Society.
DR. JAS. MCMANUS, Dental Committee.

HARTFORD, CONN., Feb. 15th, 1875.

We approve the object of the Circular, and commend it to the attention of the Medical Profession.

FRS. BACON, M.D., New Haven.
D. L. DAGGETT, M.D., New Haven.
C. A. LINDSLEY, M.D., New Haven.
DR. H. J. STEVENS, Dentist, New Haven.
GIDEON L. PLATT, M.D., Waterbury.
GEO. H. WATERS, Dentist, Waterbury.

NEW HAVEN, March 15th, 1875.

I approve the object most heartily, but my best endorsement is the enclosed check for fifty dollars. Wishing your and our enterprise every success, etc. J. MARION SIMS.

NEW YORK, March, 1875.

The undersigned cheerfully concur in the effort that is being made to commemorate the name of Dr. Wells, in connection with the discovery of the use of Nitrous Oxide Gas as an agent for producing insensibility during surgical operations.

GURDON BUCK, M.D.
A. L. NORTHROP, D.D.S., 44 West 46th St., No. 7.
CHAS. E. FRANCIS, D.D.S., 33 West 47th St.

NEW YORK, April 13th, 1875.

COLTON DENTAL ASSOCIATION, COOPER INSTITUTE,
T. H. BARTLETT, NEW YORK, March 27th, 1875.

DEAR SIR :—I have received the Wells Circular—or rather, a proposed copy—and heartily approve of it. I shall this day send my check for fifty dollars to the Treasurer, Dr. G. W. Russell.

Respectfully yours, G. Q. COLTON.

NOTES.

Resolution.

LAWRENCE, MASS., June 15th, 1875.

Resolved, That we, the members of the Massachusetts and Merrimack Valley Dental Societies, in convention assembled, recommend to all dental practitioners the discontinuance of the use of Rubber as a base for artificial teeth, and the adoption in place thereof of Celluloid, believing this course would not only be for the best interests of ourselves, but for our patients whom we serve.

Voted, on motion of Dr. McDougal, that a copy of the above resolution be sent to all the Dental Journals of the country, with a request to publish.

American Academy of Dental Science.

The eighth annual meeting of the American Academy of Dental Science will be held in Boston, on Monday, September 27th next, at 10 o'clock A. M.

The annual address will be delivered by Dr. Robert Arthur, of Baltimore. Essays will be read by other distinguished members of the profession.

E. N. HARRIS, *Cor. Secretary*,
579 Tremont St., Boston.

A Dentistic Performance.

The Place des Nations, by the Station du Nord, Brussels, is every afternoon the the scene of what reminds one of the sights that were witnessed half a century ago in England. It is here, according to the Belgian *Times*, that a dentist (?) takes his stand about two P. M., and not only collects a large concourse of people to listen to his inducements to make them have their teeth administered to, but also gets rid of a great quantity of his wares. This man makes his appearance in a vehicle gorgeously decorated with crimson, and in which are to be found four individuals who herald his arrival with a flourish of trumpets and give his audience a discourse of sweet music. Three cream colored horses draw the carriage, and both he and his wife are most elaborately costumed in crimson velvet. Once on the scene of his operations, he explains to his audience, who muster strongly, how, with the application of a certain green liquid he sells in a bottle at the price of five francs, a tooth may be extracted without the slightest pain or disagreeable feeling, and invites any one troubled with a dental affliction to mount his vehicle and have the rebellious tooth drawn. Many go, and all express satisfaction at the quick and effective result, and apparently no sooner is the instrument applied to the mouth than out rolls the tooth, and the patient jumps up rejoicing. Of course, it is impossible to say whether they are accomplices or not, but of one thing there is no doubt, the man gets rid of an enormous quantity of bottles, on which, too, there must be a great profit. Hundreds flock daily to see this man perform, and he has gained certain notoriety. Quack or not, he conducts his seances in a very lively and impressive manner. Directly a tooth is drawn, a band, which is composed of wind instruments, plays a melodious air, which is expressive of victory, and likely to give any faint-hearted sufferer a courage and determination to undergo the ordeal.

Vegetable Germs the cause of Hay-Fever.

A valuable contribution to the discussion on the germ-theory of disease is made by

Professor Binz, of Bonn. On investigating into the nature and true cause of the hay-fever, he discovered vegetable organisms in the nasal secretions, which were never present save during an attack of the disease. By using a neutral solution of sulphate of quinine, applied with a nasal *douche*, the animalcula were completely destroyed. In addition to the scientific value of this fact, the simplicity of the remedy will commend it to those who are afflicted with this annoying complaint.

Production of Ozone.

Ozone may be easily and abundantly generated in any apartment by means of an aqueous solution of permanganate of potash and oxalic acid. A very small quantity of these salts, placed in an open porcelain dish, is all that is necessary, the water being renewed occasionally as it evaporates. Metallic vessels should not be used.

Japanese Paper.

At the great Vienna Exhibition a complete collection of articles of wonderful variety, and all made of paper, attracted much attention in the Japanese section. The process of manufacture was a secret at the time, and the public were at a loss to comprehend how pocket-handkerchiefs, napkins, dresses, ornaments, umbrellas, &c., could be made so strong and durable from so frail a material. A member of the Society of Orientalists, M. Zappe, has at length penetrated the mystery, and published the process by which this paper is obtained. The substance employed is the bark of *Broussonetia papyrifera*, a sort of mulberry tree, which is also used by the inhabitants of the islands of the Pacific for a sort of cloth, the manufacture of which, however, differs completely from that employed by the Japanese for their paper. The rearing of this tree is extremely easy; its roots are cut up into pieces three inches in length, which are stuck into the ground, where they strike with astonishing rapidity. Within the first year their offshoots attain the length of nine inches, and thrice that within the second. The stem also grows fast, and reaches the height of thirteen feet in the course of three years, and if care has been taken to prune it properly, the plant has the appearance of a hardy shrub. At the beginning of winter the branches are lopped off and cut into bits two inches long, then boiled until the bark strips off easily. The latter is then laid out to dry in the air for two or three days, and afterwards exposed for twenty-four hours to the action of a running stream, and ultimately carded, whereby two kinds of fibres are separated from each other, viz.: the outer ones, called *sarakawa*, which are coarse and serve to make paper of inferior quality, and the inner ones, called *sosori*, for first-rate sorts. These latter are rolled up into bales weighing thirty-five pounds each, which are again exposed to running water, then dried, and lastly boiled in large kettles. After rinsing again in cold water, these fibres are now crushed and pounded in wooden mortars for about twenty minutes, made up into balls, and reduced to pulp, mixing therewith a small quantity of a liquid extracted from *Hebiocus manihot*, and some rice water to preserve it from the ravages of insects. That pulp is then made into paper in the usual way, or drawn into threads to be woven with silk.

A gentleman saw an advertisement that a receipt for the cure of dyspepsia might be had by sending two postage-stamps to the advertiser, and the answer was: "Dig in your garden, and let whisky alone."

JOHNSTONS'

Dental Miscellany.

Vol. II.——*SEPTEMBER.*, *1875.*——No. 21.

REPORT OF THE PROCEEDINGS OF THE AMERICAN DENTAL ASSOCIATION.

Fifteenth Annual Session, Held at Niagara Falls, August 3d, 4th, 5th and 6th, 1875.

First Day—Morning Session.

At 10 o'clock A. M., the President, Dr. M. S. Dean, of Chicago, called the meeting to order. The roll was called and the minutes read, and several amendments to the Constitution were brought up.

An amendment proposed last year by Dr. Shepard, giving the Executive Committee the power to change the place of meetings for extraordinary reasons, was withdrawn by its author.

Certain amendments to the Constitution, proposed last year by Dr. Cushing, were adopted. They provided for a change in the manner of constituting the Committee of Arrangements, providing for their appointment by the President, instead of being a branch of the Executive Committee as heretofore.

An amendment, proposed by Dr. Stockton, in regard to elections, was laid on the table.

The following resolution, offered last year by Dr. Allport, was taken up, and elicited considerable discussion :

"This Association will hereafter receive no delegate who shall, after this date, enter the profession without first having graduated at some reputable dental or medical college."

Several gentlemen contended that the proposed amendment was a manifestation of a centralizing tendency; others thought it did not go far enough. Dr. Morgan offered a substitute, which provided that no delegate who was not a graduate, should hereafter be received. (The original amendment of Dr. Allport applied only to those entering the profession in the future.)

This substitute was finally withdrawn, and Dr. Allport's amendment was then taken up and carried. No delegate, therefore, can be hereafter received who comes into the profession after this date, unless he is a graduate of a medical or dental college.

An amendment increasing the number requisite to form a quorum was lost.

The following resolution, which had been offered last year by Dr. Bogue, was then adopted:

Resolved, That it is the sense of this Association, that no dental student should be graduated from any dental college without at least three years' instruction; the latter should in no case embrace less than two full courses.

Also, the following, offered by Dr. Judd, which was also adopted:

Resolved, That this Association recommends to all local Societies the adoption of rules prohibiting their members from taking students for a less period than three years, or for such time as will complete a three years' course.

An invitation to the privileges of the floor was extended to Dr. Wilson, of Cuba, and any others from foreign countries.

After some unimportant business the meeting adjourned.

Evening Session.

Reports of committees were taken up; the Report on Physiology was called for.

Upon motion of Dr. H. A. Smith, Dr. Jno. Allen was invited to read a volunteer paper, and Dr. Allen accordingly read an essay upon the subject of the Physiology of Dental Practice, with special reference to the employments of the dentist, and their Influence upon health. He thought the progress which dentistry had made, had devolved new duties and increased responsibilities. The profession is taxed both in mind, brain and nervous system, more than any other. Different patients exert a different influence upon operators: and an hour's labor often exhausts us more than a day of ordinary toil. A long record of those whose death had occurred under a condition of insanity was read;

the names of Parmlee, Wells, Snow, Flagg, Weir, Barrot, Blakesly, Griffin, Westcott, Franklin, Keep and Whitney were mentioned as having died in that condition. We want to know how we can prevent a premature exhaustion of the vital forces. Narcotics, exercise and stimulants have been recommended. The laws of nature must be observed, and the more closely we do so, the more strength we shall receive. Only fourteen different nutrient substances are found in the numerous organs and tissues of the body, which is built up from them atom upon atom. There are four classes of nutrient substances, the proteins, the fats, the amyloids and the minerals. Other substances are introduced by man, which are not nutritious, and also injurious. They are useful as medicines, but are poison in larger doses; tobacco, alcohol, etc., cause in large doses narcosis and death. Waste is supplied in a proper manner when the proper materials in due proportion are furnished; but narcotics do not supply the waste. Is the great mortality in our ranks owing to the exhausting nature of our labors, or to bad habits and the use of these articles? Or is the want of exercise to be blamed for it?

To bring this matter before the local societies, Dr. Allen closed with a resolution, which was as follows:

Resolved, That a committee of three be appointed, whose duty it shall be to collect facts with reference to the subject matter here presented, and also the best means of preserving the physical and mental capacity of dental practitioners.

This resolution was adopted, and the committee, consisting of Drs. Jno. Allen, W. H. Morgan and W. E. Magill, was appointed by the President.

The report of the Committee on Physiology was then read by the Chairman, Dr. McQuillen.

At the close of the reading the subject was discussed by several gentlemen.

Dr. Atkinson: I rejoice that we are approaching nearer a solution of principles. Describing conditions does not define things, and it is assumed that we know what sleep is; but we don't, and until we do we cannot reach any profitable conclusions. If I could tell the difference between sleeping and waking I should think I was about ready to be offered. There are but few who could understand me if I was to say that it is only a polarization and depolarization. It isn't as tangible a thing to deal with as a stone fence. When the resident demand of the organism for a quantum of power is supplied, and more than supplied,

we are awake. It is difficult to explain all the details of function to one who is not familiar with the generation of tissues—yes, and with the generation of the elements of tissues. We don't know anything about chemistry, and it is a scapegoat to make us appear learned, when we are the merest blanks. We must begin by alphabetically nominating modes of motion, before we can discover what physiological processes are. We cannot formulate that of which we have no perceptions. We only exhibit the densest ignorance when we attempt a definite pronouncement of the functions and processes which we have only partial or incompetent means of determining. I want you to understand that anæsthesia is death, just in the ratio of its manifestations.

What do we call poisons? Those agents which are said to act on nerve centres. But we don't know what nerve centres are. A human being is at first only a bleb of nervous mass. When is oxygen a supporter of combustion? Not till it is set free, of course, and we all know it is then. The difference between sleep and death is that one is a depolarization forever, and the other is only for the time being. How do the heart and lungs get along without sleep? If we slept all over at once, we should die all over at once, and at the same time.

Dr. McQuillen said that the corpuscle is not regarded at present by histologists as a vesicle filled with a fluid, but as a soft solid. Breathing and the heart's action afford regularly recurring periods of rest, and the tissues of those organs sleep during those intervals. When we see a man reeling from drunkenness, we are told it is only a deprivation of oxygen. This is all very fine!

I recognize the difficulty of defining sleep. The subject is so deep that language is insufficient to express these subtle principles, and the brain fails to comprehend them. We cannot penetrate to cause, but can only define the phenomena we see. Through our blunders we may reach success, though not, perhaps, in the direction in which we are looking.

Dr. Atkinson: It is nothing but privity of oxygen that makes men drunk. We are apt to call things by the wrong names. We never get quite pure nitrous oxide. NO is almost always NO^2. Even when it is in cylinders, and the very purest that can be got, and they tell us that it is perfectly pure, it still contains NO^2, and don't let us be fools enough to believe that anything else is true. If any of this NO^2 is inhaled, and comes into contact with blood corpuscles, the corpuscle is satisfied, and there is effete matter. Anæsthesia is at the bottom of a great many diseases. When Lord Oxygen has a union with two *Miss Nitrogens* we may look out for trouble.

Dr. Magill : We want to derive practical instruction from the papers on this subject ; we want to know what induces insomnia ; whether it is mental excitement or the extreme tension necessary in our labors, or the exhaustion of which we are all so conscious. A very practical field has been opened by Dr. Allen's paper. We want to find remedies for excitement. We should discuss whether sleep is the withdrawal of blood from the brain, or the flow of blood to it. If it is the withdrawal of blood, some relief from insomnia might be found in a remedy which has been proposed, viz. : eating a cracker or something of the kind upon retiring. Anything which will prevent the exhaustion to which we are subject, by leading us to understand its causes, will be better than any remedy.

Prof. Flagg : We want something that is practical, and unless we can get such results from these papers and discussions we shall have nothing tangible. Sleep is a very extensive subject, and if having done a good deal of it in his time and expecting to do more, makes a man competent to discuss it, he felt as though he ought to be competent. Dr. Atkinson had said a good many things which he could understand, and a good many more which he could not ; that part of his remarks which he (the speaker) could understand seemed to be very near the mark, and it was reasonable to suppose that the portion he could not understand was still nearer to it.

Sleep is a desire for further life. When it is strong and deep it recuperates, but when it is short and slight it does not satisfy. We do become exhausted mentally and physically, and it is our duty to recognize the fact. We ought to get sleep enough, and not work over the chair and in other departments from early in the morning till late at night. Hard work had reduced his own weight to 120 pounds, and he was entirely prostrated ; but he had removed to some miles distant from his office, and rests from Friday night to Monday morning, and by this means, together with eating the best food and sleeping eight full hours every night, he had become reorganized, and increased in weight to 160 pounds.

Anæsthesia is death ! It is not fatal in every case, but that is no reason why we should think it is not harmful. It plants the seeds of disease, and produces conditions which favor the production of chorea and other diseases which are worse than death. There are hundreds of such cases in the asylums. The patients do not ascribe their condition to taking ether, but they will tell you that since the time of taking it they have not been as well, and have had symptoms of barking, and

twitching of the muscles. Hundreds of patients are ignorantly or innocently swung down into the very jaws of death and then swung back again. We have to do it if we use anæsthetics, but it is little less than death. The patients are never the same afterward. The speaker has administered anæsthetics from three to five times a day for twenty years, and thinks that he knows whereof he speaks. Every time he has used them he has trembled for the health of the patient. It has had a bad effect on himself. He had suffered from insomnia and nervous irritability till he had abandoned it.

Prof. Taft wished to emphasize the expressions of Prof. Flagg. Large numbers of our profession are in the daily use of anæsthetics. Some use one kind and some another, but a great many use nitrous oxide. It is an important question for us to determine whether the influence which has been mentioned is liable to occur. If it is thus injurious to the patient, it must be much more so to the operator who is constantly inhaling the agents. Prof. Flagg has told us his own story, and this will no doubt account for many cases of insanity.

Prolonged effort is not the only cause of the exhaustion which we feel. There is often a great incompatibility between patient and operator. An hour's work for some patients will exhaust more than a whole day's work for others. They will exhaust the mental energy, and take away the bodily strength. He refuses to operate for such patients simply on this ground.

Dr. Rehwinkel desires to add his testimony to the truth of the remarks made by Drs. Taft and Flagg. He was once in the penitentiary, and at that time looked upon chloroform as harmless as water. It was officially announced by the authorities, that the new drug (this being soon after the discovery of chloroform) was to be thoroughly tested, and it was implied that no responsibility was to be incurred if any fatal result should occur. There were no operations performed there, not even the most trivial, without using it; the convicts thought it a pleasant variation of prison life; many patients had come very near being sent prematurely to the happy land! The more he used the agent the more he was afraid of it, and for ten or twelve years he had only used it in capital operations, when it was but a chance for life.

A case of an ether toper was mentioned—a person who had first taken it for the purpose of stimulation and exhilaration. He became addicted to the use of it, and finally could not live without it, consuming as much as two pounds per day. He impoverished himself to procure

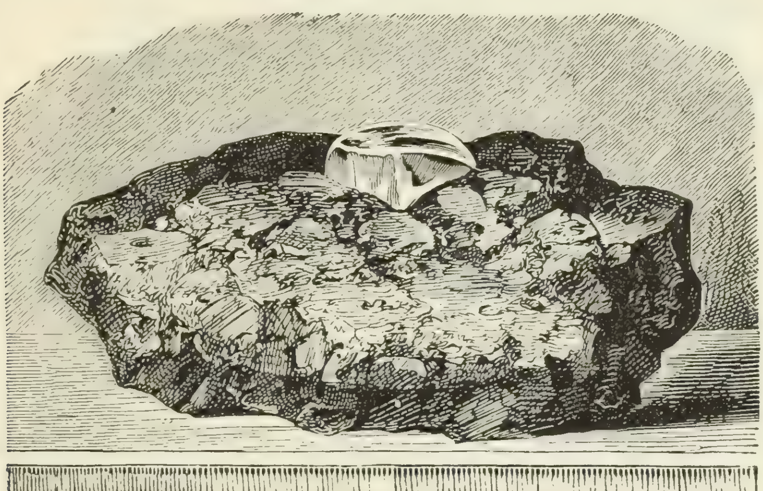
the drug, and would beg it when he could get it in no other way, and became the terror of druggists. He was finally admitted to a hospital and experimented upon, to ascertain how much ether it would require to bring him under its influence. It was found that even with the most approved inhaler, six and three-quarter ounces were taken without entirely etherizing him.

The meeting then adjourned.

SOUTH AFRICAN WONDERS.

EXPLOSIVE DIAMONDS AND TURTLES WITH TEETH.

Diamonds liable to explode spontaneously, and turtles provided with canine teeth, are two natural marvels indigenous to the fields of Southern Africa. The former are found at the present time, the latter existed ages ago, and are recognized by their fossil remains, which have been discovered in the same deposits with the gems. One of these disintegrating diamonds is represented in our first engraving in its natural size.

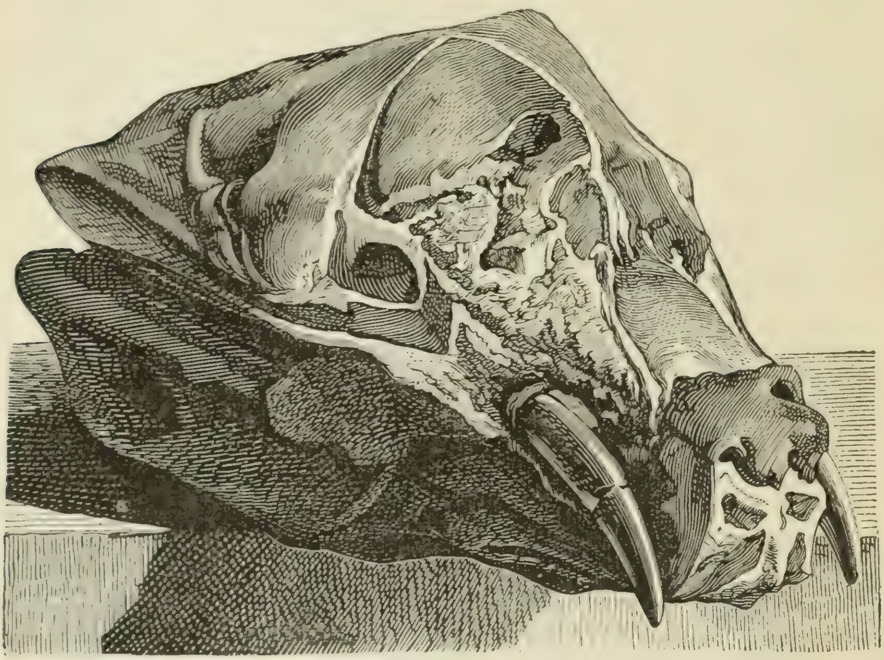


EXPLOSIVE DIAMOND IN ITS NATIVE SANDSTONE.

It is a rounded octahedron, imbedded in a conglomeration of fine grained sandstone. Some idea may be gained of the richness of the South African beds from the fact, it is stated, that more than three thousand diamonds have been found during the past eight months. The mines are of two distinct kinds ; the first, called "dry," are located in the centres of plains, and consist of layers of rock, in which the

precious stones are mingled with garnets, pyrites, etc.; the others, termed "river mines," are established on the beds or banks of water courses, and the diamonds in these are mixed with agates, emeralds, and chalcedony. In both, however, the gems are rarely found other than in a fragmentary state, and this is ascribed to the strange peculiarity of the finest and largest stones in suddenly disintegrating or exploding. Ordinarily rupture takes place during the first week after the diamond is brought to light, but cases are known where it has occurred three months subsequently. It is said that covering the stone with tallow will prevent the trouble: but of course, if the grease has to remain permanently upon the diamond to preserve it, its value is destroyed.

Although the geological age of the African diamond fields has not been absolutely fixed, it is generally believed that they date from the triassic epoch. In the strata are found the remains of crocodiles, deno-



Fossil Skull of a Turtle with Teeth.

saurians, labyrinthodontes, and other monsters of antiquity, but the most interesting and curious are those referred to in the beginning of this article. The skull from which our engraving was made strongly resembles that of the turtle, but it has two long tusks analogous to those of the walrus. Professor Richard Owens, who has profoundly studied this remarkable fossil, believes that the animals, or *dicynodontes* (the name is derived from the Greek, and means literally two dog's teeth),

were, when living, oviparous, cold-blooded, and yet with pulmonary respiration; and he also recognizes peculiarities which ally them closely to the lizard family. Huxley is of opinion that they were provided with long tails. The peculiar genus to which the reptile, the remains of which our engraving represents, belongs is termed *ptychognatus*, and the species, *depressus*. The bones are not perfectly preserved, and were found in hard sandstone of fine grain and greenish color. In the lower jaw two cavities are noticeable, resembling incisive alveolæ which may be really rudimentary teeth.

The characteristics of the animal are remarkable from the fact that they seem borrowed from those of creatures most widely separated in nature. As a whole, the bones indicate a reptile between the lizard and tortoise. That is, the forward portion of the head resembles that of the former ; and the edges of the edentulated jaws, covered during life with a bony covering like a beak, relate to the latter. The oblique manner of opening the mouth recalls the same peculiarity in certain fish. Huxley, on the other hand, asserts that the nostrils and various points in the osteology are those of birds. The tusks are more analogous to the teeth of mammifers, while the sutures of the skull resemble those of the latter, and are never met with in the case of reptiles.

ON THE RELIEF OF TOOTHACHE BY BICARBONATE OF SODA.

Dr. Dyce Duckworth records in *The Practitioner* a case of severe toothache in a boy, which he attempted to relieve by rubbing the cheek with chloroform ; by putting some on cotton wool inside the auditory meatus, by plugging the tooth with cotton wool saturated with chloroform, also with carbolic acid, but to no purpose. He next tried a solution of bicarbonate of soda, which was quickly followed by complete relief.

The pathology of saliva is as yet, so far as I know, observes Dr. Duckworth, an uncultivated field, but I believe, if it be looked for, that this secretion will be more often found to possess an acid reaction, than is generally believed or thought, and I also think that useful

therapeutical hints may be gathered by the employment, at various intervals, of litmus paper in the mouth, in many cases of dyspepsia and chronic disease.—*Monthly Review of Dental Surgery.*

TEETH AND TOOTHACHE.

In our last number, it may be remembered, we published a brief memorandum, by Dr. Duckworth, on the value of bicarbonate of soda for the relief of toothache.* Dr. Duckworth's recommendation has brought more than one other capable correspondent to the front, and in the current issue of *The Practitioner*, some little space is devoted to the matter. As the subject is one in which very many chemists and druggists, no less than medical men, are greatly interested, no apology will be necessary for treating it in our pages.

Dr. W. B. Holderness, of Huntingdon, writes :

"I see Dr. Duckworth speaks very highly of the use of bicarbonate of soda for toothache. I have for a long time very frequently been successful in giving patients relief by stopping the hollow tooth with a paste made in the palm of the hand, by dropping on to a good pinch of the bicarbonate of soda as much tincture of opium or of the vinum opii as the soda will take up, working the whole into a paste, and putting into the tooth." This hint may possibly be useful in some cases, but Mr. J. Smith Turner, M.R.C.S., and dental surgeon to the Middlesex Hospital, offers a far more complete and useful contribution to the discussion. He holds, and, as we think, not unreasonably, that while the employment of bicarbonate of soda will not unfrequently be attended with great benefit, to suppose that its appplication will invariably produce the desired result may lead to unreasonable disappointment. The term toothache is applied indiscriminately to all pain situated in or around the teeth, but the disturbance may arise from different causes. The pain in Dr. Duckworth's case evidently arose from the covering of the tooth-pulp being insufficient to protect it from the action of the saliva, or from the exposure of the dentine to the secretions of the mouth through the loss of its natural covering, the enamel. Hence the subsidence of pain on the use of the antacid. The same application is of great use where the enamel structure is feeble, and where numerous defective spots are present, as is frequently

* This is the short article preceding.

seen in young phthisical patients; also in children where there is a general defective condition of the first teeth, proceeding, it may be, from neglect or from defective development, or from some disease of the mucous membrane; and in pregnant women, in whom the teeth are frequently found decaying round the base of the crowns in a line with the margin of the gum. That the toothache from which such subjects suffer is due to a vitiated condition of the fluids of the mouth may be inferred from the sudden access of pain so frequent after eating or during sleep, and which is so often ascribed to increase of temperature, or to the increase of circulation in these parts owing to the recumbent position, but which is speedily relieved by the use of a tepid solution of soda bicarbonate. Mr. Turner then continues: Some of the conditions inducing toothache are equally patent or equally obscure to the general practitioner and to the specialist. Ulceration of the membranes of the mouth, for example, would be at once observed, while irritation of the dental nerve in the absence of a visible cause, could only be diagnosed after careful and extended observation, and perhaps some unsuccessful efforts in treatment. There are, however, conditions and suffering and consequent constitutional disturbance which the general practitioner should be able to ameliorate until such time as special skill be available. A decayed tooth may give pain although the tooth-pulp be not exposed. The alkaline lotion will not give relief, and if the saliva be tested it may be found normal. The cause of the pain must therefore be sought in the tooth itself. The decayed dentine is an irritant; this ought to be removed at least partially if not entirely. To do this without exposing or wounding the tooth-pulp is a delicate operation, and a man not in daily practice could not be expected to accomplish it completely; still, enough may be done to serve the immediate purpose. A small mouth-glass and a few excavators, such as are to be had at any dental depot, are all that are required in the way of instruments. Their cutting edges should be round or spoon-shaped—if they have any sharp angles they are much more likely to wound the tooth-pulp. The cavity should be syringed with tepid water, and that may be sufficient; but there is generally a quantity of soft dentine which should be removed if possible. The cavity should be dried out with cotton wool or some other absorbent, and a small pellet of wool moistened with carbolic acid and glycerine should be placed in it, and over this a piece of wool partially moistened with mastic (white hard varnish answers admirably) should be packed. The packing may be accomplished with a blunt probe, and the pressure should be light and

not in the direction of the pulp cavity. This will serve till a permanent plug can be introduced, but should not be trusted beyond two or three days, especially in cavities between the teeth.

If the cavity be on the masticating surface of a tooth the wool should be free from pressure on the occlusion of the antagonizing teeth. If it be an interstitial cavity, the gum beyond the margin of the cavity should be disturbed as little as possible, unless it has grown into it, when the wool should be packed with a view of pushing the gum out. If the margin of the gum be left projecting into the cavity, its secretion will become abnormal, owing to the irritation caused by the wool ; the cavity will be inundated with the secreted fluid, which will have no way of escape, and the discomfort of the patient thereby aggravated rather than relieved. If possible the wool should not be allowed to depend upon support from the adjacent tooth for retaining its position, as the pressure is likely to separate the teeth, when the plug will leave the walls of the cavity, and so matters will return to their original condition. The wool used for this purpose should be deprived of its greasy character ; hence the pink wool, which has been cleansed before dyeing, is best for use.

Toothache may arise from an exposed tooth-pulp, and in such a case the same course of syringing and cleaning should be pursued as already laid down, and some application used which will subdue the irritation of the pulp, applied as in the former instance, and covered over with wool and mastic. Creasote is an old and deservedly a favorite remedy for such a condition of things, but it should be pure wood creasote, as that which is made from coal-tar is very likely to act as an irritant. The following mixtures are recommended for use in place of creasote, and if complication be a merit they have that advantage :

℞ Acidi carbolici solutionis saturatæ
Chloral hydratis sol. sat.
Tinct. camph. co.
Ext. aconit. fluid āā fl. ℥j.
Ol. menth. pp. ℥ss.

℞ Chloral hydrat. ʒj.
Aqua fl. ℥ss. Misce et adde.
Tinct. aconiti (Fleming) ♏xv
Chloroformi
Ætheris
Spt. vin. rect. āā ♏ xx

Liq. opii. sedativ.
Ol. caryophyll. āā fl. ℥ji.
Camphor. ʒiss.

This last I have found very useful.

Pain may arise from inflammation of the periosteum, and may be situated in an otherwise healthy tooth which has been jarred or wrenched ; such cases are not uncommon in the game season from shot or bone splinters getting between the teeth during mastication. Or it may come from a tooth carrying a large mass of metal stopping having been subjected to unusual conditions, such as exposure of the side of the face next which it may be situated in riding against wind or rain. A low state of health, constipation, exhaustion after violent exercise or prolonged occupation, rheumatism, scrofula, or syphilis may all produce this inflammation. The gum surrounding the affected tooth is visibly inflamed, and the tooth is tender to the touch, and becomes elongated and loose. The degrees of inflammation are various, and in its early stages may be cut short by wiping the gum dry, and frequently applying tincture of iodine of double strength all over the inflamed part. A piece of cotton wool soaked in water as hot as can be borne, and laid between the gum and the cheek, makes an excellent poultice, and if accompanied by a slight aperient, is almost sure to give relief in a chronic case. The constitutional treatment required must be obvious to medical men, who have much more command over their patients in the administration of general remedies than the dentist ; but I may mention that there is no medicine more likely to cut short in its early stage an acute case of periostitus connected with the teeth than five grains of Pil. saponis co. Two leeches applied to the gum over the affected tooth have repute for doing good, but in some cases prove very disappointing. If there be marked swelling of the gum towards the apex of the affected tooth, lancing is the best thing that can be done, but to be effectual it must be done thoroughly. The instrument should be strong as well as sharp, and capable of cutting through the alveolar plate between the gum and the tooth. Before lancing, Mr. Tomes recommends that the gum should be painted with equal parts of tincture of iodine of double strength, and Fleming's tincture of aconite.

Teeth may become tender around the neck from recession of the gums, or from an artificial case of teeth being attached to them. The exposed parts of the tooth should be cauterized with nitrate of silver, and if a metal plate have to be worn again immediately, a layer of tissue paper ought to be placed between the cauterized surface and the metal. As the nitrate of silver should be allowed to remain on the tooth a few minutes in order to prove effectual, the cheek and tongue and saliva should be kept away from it as much as possible by holding some ordinary cotton wool round the tooth. When the wool is withdrawn a

strong solution of salt should be used immediately, to convert any free nitrate into an inert chloride. Unfortunately the nitrate of silver cannot well be used on the necks of front teeth where a ring of sensitive decay is often found, but it is a valuable remedy where appearance is not in question.

The after pain of an extraction may be modified by washing away the blood-clot and lightly plugging the alveolar cavity with wool saturated with

℞ Acidi carbolici glacialis
Liq. potassæ āā ʒj
Aquæ dist. ℥j

as recommended by Mr. Tomes in his "System of Dental Surgery."

From the foregoing remarks it may be inferred that there are degrees of inflammation of the tooth-pulp and of the periosteum. As the treatment of subacute inflammation of the tooth-pulp is very limited and quite incomplete unless the tooth be properly plugged, so in cases of acute inflammation of that organ, the general practitioner can only relieve the patient temporarily, that is, if the tooth is to be saved. It may be well, however, to point out that subacute inflammation may arise from injury by mechanical violence, or from the masticating surface of a tooth being denuded of enamel even to a very small extent. The tooth becomes troublesome, and frequently reminds its owner of its existence when subjected to thermal changes, or even the ordinary work of mastication. If, on careful examination of a tooth so affected, there be no signs of structural defect observed, search should be made for a decayed tooth elsewhere. When this is found, a process of examination, such as tapping with an instrument, or probing the decayed part, or directing a stream of cold water onto it, may start all the symptoms complained of in an intensified form. In rheumatic people and people under the influence of mercury, the irritable state of the teeth is often found. In acute inflammation of the tooth-pulp the history generally extends over a long period. Different substances have annoyed a tooth in which a cavity has been known to exist a long time, but which, according to the patient, has always remained the same. Sweets or bitters, heat or cold, have every now and then caused uneasiness, but when these disturbing causes have been removed the pain has ceased. But at length the periods of cessation have diminished, and the length and intensity of the attacks have increased, the pain radiates from the tooth to the other teeth and over the side of the face, and assumes a throbbing character. These attacks last several hours and then sudden-

ly subside, but surely to return again, sometimes without the smallest apparent provocation, or if the patient lie down. This will go on for a shorter or longer period and with varying intensity, according to the constitutional state of the patient, till the pulp dies. The next state of the tooth is the commencement of an alveolar abscess, which, if not attended to, may involve the removal of the tooth and even of a portion of the alveolar plate, or even further mischief.

In chronic inflammation of the tooth-pulp the pain is less regular in its advent, shorter in duration, and less severe than in acute cases. The peculiarity of most importance is the straggling neuralgic pain which is rarely referred to a definite centre. If any tooth be specified as its seat, it is not unlikely to be a sound one, but even its being decayed is not sufficient in itself to condemn it. In fact, the tooth which is nearly destroyed by caries is not so likely to be the offender as one which is in a better state of preservation. The careful application of a blunt probe to the floor of the cavity will readily detect the irritated nerve, which should be treated as already described, or the tooth removed if worthless.—*Monthly Review of Dental Surgery*.

PLATINUM.

Platinum is one of the rarest of the metals that have any applications in the arts, but it is one of the most valuable. The whole quantity produced annually throughout the world averages little more than a couple of tons. As the specific gravity of the metal is over twenty-one times that of water, the bulk of this yearly product scarcely exceeds that of three-quarters of a ton of iron. The amount is comparatively insignificant, but its importance to the chemist is almost incalculable. If any metal may be specially designated as the chemist's metal, platinum is entitled to the distinction. It bears a very high temperature without melting, and is proof against the action of so many acids and other chemical agents that it is invaluable as a material for a great variety of vessels and implements required in the laboratory. The first cost of this apparatus is high, but since with proper care it is almost imperishable, it proves more economical in the long run than much cheaper materials, even in some processes for which the latter could be substituted. For instance, glass retorts can be employed for the concentration of sulphuric acid, but the loss from breakage is so great, that in many manufactories platinum boilers are used, notwithstanding their

enormous cost. A boiler capable of concentrating daily five tons of sulphuric acid, costs in England about $8,000, and one for eight tons daily $12,500.

Though platinum is a rare metal, it is, like gold, very widely diffused. According to Pettenkofer, silver invariably contains a small quantity of it. The chief sources of the metal are the Ural Mountains, whence about four-fifths of the whole annual product is obtained, and Brazil and Columbia, which supply nearly all the remainder. Small quantities are got in California, Australia, Borneo and elsewhere. The metal was first discovered in South America by the Spaniards, who gave it the name of *platina* (a diminutive of *plata*, silver,) because they supposed it to be an inferior kind of silver. The name was changed to platinum to make it conform to the modern nomenclature, according to which the names of all metallic elements end in *um*.

In nature platinum is found associated with a number of yet rarer metals—palladium, rhodium, iridium, osmium and ruthenium—which are found nowhere else. It is extremely difficult to separate it from these, and our limits forbid any description of the methods that have been adopted for the purpose. It is a curious fact that the method originally devised by the English Dr. Wollaston is one employed by the French manufacturers, while the more recent method introduced by two Frenchmen, MM. Deville and Debray, is the one adopted by the great London workers in platinum, who now lead the world in this branch of metallurgy. At the International Exhibition of 1862, this English firm displayed an ingot of pure platinum weighing 280 pounds, and valued at about $20,000. Last year an ingot weighing 550 pounds, containing a small percentage of iridium, was made in Paris, which is to be used for standard metre bars.

As already stated, platinum is chiefly applied to the manufacture of chemical apparatus; but it is employed to a limited extent in other scientific instruments, and also in jewelry in connection with gold, and as a setting for diamonds. The fact that it expands with heat less than any other metal, has led to its use in dentistry for pins to hold artificial teeth in place. In 1828 the Russian government began to use it for coinage, but in 1845 all the platinum money in circulation, amounting to some 30,000 pounds' weight, was called in, and none has since been issued.

Though platinum resists the action of the most powerful acids (the mixture of muriatic and nitric acids known as *aqua regia* excepted), and is not affected at ordinary temperatures by other chemical agents,

it is readily attacked at high temperatures by phosphorus, arsenic, carbon, borom, silicon, many of the metals, the caustic alkalies, and the alkaline earths; so that much care is required in the laboratory in using vessels made of it. An inexperienced manipulator would be likely to find platinum as perishable as many of the cheaper metals.

ADVANTAGES OF THE METRIC SYSTEM.

From an interesting little work on this system, by J. P. Putnam, published by Hurd & Houghton, we copy the following:

SOME OF THE ADVANTAGES OF THE METRIC SYSTEM.

The advantages of having a common system of weights and measures throughout the world are manifold :

1. It renders intelligible to us all foreign literature containing statements of values in weights or measures, which would otherwise be useless ; and, reciprocally, it renders our books, magazines, and journals intelligible to foreigners, and facilitates their circulation abroad ; in short, it opens between nations channels of communication which would otherwise be closed.

2. It removes that impediment to the propagation of knowledge among the people, such as now exists in our country when our scientific books employ, as is generally the case, the metric system, or to the progress of science itself, when the metric system cannot be adopted in the books.

3. It facilitates commerce by removing the possibility of delays, inaccuracies, and difficulties in reducing values from one system to another, and the liability to imposition which would otherwise result from a diversity of systems.

4. It facilitates travel in foreign countries, and diminishes the danger of imposition.

THE METRIC THE ONLY SYSTEM THAT CAN BECOME A COMMON SYSTEM.

That the metric system is the only one that can ever become universal is now no longer a matter of doubt. It has already taken too deep root, and its superiority over all other systems is too widely appreciated to allow of its ever being torn up and supplanted by another. Even had it become less universal, it is clear that, had we refused to adopt this, the most perfect of systems, for the sake of uniformity, we should have

been still less willing to accept any other. On the other hand, it would, for the same reasons, have been doubly impossible for us to persuade other nations to adopt ours, especially as no two systems were commensurable with each other. Charles Sumner says: "A system of weights and measures born of philosophy rather than of chance is what we now seek. To this end old systems must be abandoned. A chance system cannot be universal. Science is universal. Therefore, what is produced by science may find a home everywhere."

THE ADVANTAGE OF SIMPLICITY.

Twelve words are all that are necessary to designate the various units of weights and measures, and all their decimal multiples and subdivisions in this system. The metric system is composed of twelve words. Surely this cannot be very difficult to master. Our present system is composed of about fifty words.

In order to insure these twelve words against all possibility of change, and to facilitate their acceptation by all nations, they were not taken from any modern language, but are derived from the Greek and Latin, the two principal languages of the ancient world. These words are:

UNITS.

1. Meter, from the Greek Metron, a measure.
2. Liter, from the Greek Litra, a pound.
3. Gram, from the Greek Gramma, a small weight.
4. Are, from the Latin Area, a surface.
5. Stereo, from the Greek Stereos, a solid.

SUBDIVISIONS.

6. Milli, from the Latin Mille, thousand.
7. Centi, from the Latin Centum, hundred.
8. Deci, from the Latin Decem, ten.

MULTIPLES.

9. Deka, from the Greek Deka, ten.
10. Hecto, from the Greek Hecaton, hundred.
11. Kilo, from the Greek Chilioi, thousand.
12. Myria, from the Greek Myrioi, ten thousand.

These words are already in use in the English language. Thus, Meter in *thermometer*, *meteorology*, etc.; Liter in *litrameter;* Gram in *gram* (see Webster's Dictionary); Are in *area;* Stere in *stereoscope;* Mille in *millennium* or *mill;* Centi in *century* or *cent;* Deci in *decimal;* Deka in *decade;* Hecto in *hecatomb;* Kilo in *chiliad;* Myria in *myriad.*

In addition to the tables already given these two are used :

SQUARE MEASURE.

10 centi-ares (=1 sq. meter) make a deciare.
10 deci-ares (=10 sq. meters) make an are.
10 ares (=100 sq. meters) make a hectare (=1,000 sq. m.)

SOLID MEASURE FOR WOOD.

10 deci-steres (=10 of a cubic meter) make a stere.
10 steres (=1 cubic meter) make a dekastere.

Being accustomed to the words mill, cent, and dime, we shall find the words "milligram," "centigram," and "decigram," quite as simple and easy to pronounce as our words "pennyweight-troy," "hundredweight-avoirdupois," "scruple-apothecaries," etc., notwithstanding the assertion to the contrary of those who grieve to give up the "*short and sharp Anglo-Saxon words* used in our present *familiar* old tables" of weights and measures.

Finally, the metric has all the advantages in point of simplicity over all other systems of weights and measures that our Federal system of money can claim over the monetary systems of other countries where the denominations are not decimal.

In England, a body called "The International Decimal Association" sent a circular to school-masters, asking how much would be saved in that country in education were the metric to supplant the old system.

After a very careful calculation, the answer returned was that there would be a saving of money of about 350,000*l.* ($1,750,000) a year, and in time an amount equally astonishing. The reason of this is the difficulty, in elementary education, of committing our tables to memory, and learning to manipulate them, and the absolute hopelessness of being able to remember them. A vast amount of valuable time and energy, which is needed for useful study, is lost in attempting to master these tables.

THE ADVANTAGE OF UNALTERABILITY.

The base of the system has been rendered unalterable by reproducing, on scientific principles, and with mathematical accuracy, the standard previously obtained and preserved at Paris, and distributing copies for use and safe-keeping among the several nations of the civilized world. Thus, the unit of length becomes as indestructible and unalterable a standard as the meridian itself, or any other natural, unalterable magnitude, and guarded by all nations, no one can alter it by legislation.

THE RUBBER DAM.

By "Investigator."

Upon the subject of the utility and importance of the Rubber Dam but little has been said, and as the time of the probation of this most admirable and essential adjunct to the dental operating room is already past, we will attempt in as concise and practical a manner as possible, to set forth some of its merits.

But few years have passed since Dr. Barnum first bestowed upon the profession this invention, but notwithstanding this, the use of this agent has become so general, that even the *public* are beginning to appreciate its manifest virtues and advantages, as compared to the old and most unpleasant way of restraining the encroachments of the saliva during the operation of filling teeth.

Having used the Rubber Dam almost from its introduction, we feel that we can confidently assert that "we know whereof we speak," and whatever is here said upon the subject, will be warranted by actual experience, and not based upon vague theories. Many at first were cautious in the adoption of the Rubber Dam, and even now there are those who, through ignorance or prejudice, refuse to avail themselves of the "lights placed before them;" but at the same time we can say that we have never known an intelligent and progressive practitioner to fail to adopt its use *as a necessity*, who had once witnessed a practical application of this agent.

The old and most reasonable objection to its adoption, viz.: the "impossibility of applying the Dam, in cases where the caries extends beneath the gum," can no longer be urged against its use, as it has been satisfactorily demonstrated that in most cases the *gum*, after a free incision around the diseased organ, can be forced and kept entirely out of the way by the use of clamps, ligatures, or wedges; and when this is found troublesome, a shorter method may be resorted to—that of removing entirely such portions thereof as impede the adjustment of the Dam, which operation will be found very simple, and comparatively painless. Of course the hemorrhage induced need cause no detention, as the "apron" will as effectually exclude the blood, as it does the ordinary secretions of the mouth.

That difficulty *is* often experienced in getting the Dam into position, we will not deny, but the feat once accomplished, the operator can

"rest on his oars," and proceed leisurely to the accomplishment of his object. It will be found extremely difficult, and in some cases impossible, to adjust and keep in position the appliance when the teeth of the patient have not gained their permanent prominence, as is often the case with young persons. At such times the practitioner is called upon to introduce temporary fillings, examining and renewing them at proper intervals, until the difficulty shall have been obviated, when the Dam may be successfully applied, and permanent fillings of gold substituted.

In addition to the feeling of safety (to a filling being introduced), imparted to the operator when his Rubber Dam is in position, it will be found that a positive saving of time and material is the result, as the working qualities of the gold are only secured and maintained where absolute dryness exists, the moisture from the breath alone being sufficient to defeat an operation, which has perhaps already cost the dentist hours of labor and perplexity, to say nothing of his throbbing temple and disabled back!

As there are many in the profession practicing in remote places who have never seen the above appliance in practical use, a few words in explanation of the ordinary proceedings may be advisable and appropriate: Before commencing to excavate, it is proper to cut, in the "Dam," at least three small holes, varying from the diameter of an ordinary pin's head to that of a small pea; or, perhaps, the safer rule is to regulate the size of the openings by that of the necks of the teeth over which they are designed to go, aiming to secure sufficient tension in all directions, as to preclude the possibility of the encroachment of the saliva. These openings should be at such a distance from each other as to prevent the "bagging" of the Dam when in position, as should this occur, it will prove a serious hindrance in filling approximal cavities. Having selected, for instance, a *left superior central incisor* with approximal cavity, it is proper to cut into the Rubber Dam two openings of equal size for the centrals, and one smaller for the left lateral incisor, proceeding to introduce the teeth through their respective openings, until the Dam shall invest them above the point of decay, where it should be closely confined by clamps, or some other appliance suited to the case. After the proper position shall have been attained, the upper corners of the apron of rubber may be confined by means of elastic cord and hooks behind the head of the patient, while the lower edge is kept down by weights hanging upon the breast.

The operator will find the above process exceedingly simple, as there

is seldom any difficulty in carrying out the plan when the teeth are situated favorably ; but in managing molars it will sometimes be found impossible to accomplish the object, without the assistance of suitable forceps and a varied assortment of clamps.

It will also sometimes baffle an inexperienced operator to get the Dam between such teeth as grow in very close contact with each other, but by using thin metallic wedges, a sufficient space may invariably be gained to admit of the adjustment of the rubber over a single tooth at a time.

The dark shade given by the Rubber Dam to all surrounding parts has been a serious obstacle to its use in posterior approximal cavities in molars. To overcome this difficulty it is necessary, in addition to securing the best possible light, to resort to the assistance afforded by the mouth mirror. We may here be pardoned for calling the attention of inventors and manufacturers of dental goods to the practicability of supplying to the profession mouth glasses which can be attached to adjoining teeth, giving light from a fixed point, in any direction desired during an operation.

An ordinarily small mouth mirror, mounted upon a ball and socket joint, with a few self-adjusting clamps, will be found of infinite advantage in filling cavities, where it is difficult with the ordinary glasses to gain sufficient light. The Dam will most effectually prevent the rapid clouding of the mouth glass, which has heretofore rendered the use of the latter so unsatisfactory.

In enumerating the advantages of the article on which we write, we must not fail to note the fact, already made public by more than one gentleman of the profession, that a tooth protected from the secretions of the mouth is infinitely less sensitive than when those fluids are uncontrolled, and here is an argument in favor of its use, claiming the attention of all ; for who of us would not gladly diminish the sufferings of those who place themselves in the pale of our professional skill? In addition to the foregoing valuable properties of the Rubber Dam, we must not omit to touch upon the safeguard it affords in the application of arsenous pastes, carbolic acid, etc., all of which are, without this protection, often more or less liable to injure the soft parts of the mouth.

Having proceeded thus far, and not desiring to spin out a wordy essay, we will briefly review and bring together the points of advantage touched upon in the foregoing pages.

Firstly.—The greater degree of comfort afforded the patient during

the operation of filling teeth by the Rubber Dam, as compared with the old method of securing the absence of moisture.

Secondly.—The efficiency of the same in difficult cases, where before it was impossible to fill, successfully, cavities extending beneath the gums.

Thirdly.—The saving of time, labor and material.

Fourthly.—The certainty of result attending its use.

Fifthly.—The diminished amount of pain to the patient, and—

Lastly.—The absolute absence of risk to the soft parts of the mouth, in the application of arsenous pastes, etc., as afforded by its use.

Admitting, then, as all must do, that we live in an age when progress is making gigantic strides, how important that we, as a profession, should avail ourselves of every safeguard within reach, and how imperative the duty that we should, *every one of us*, seize upon and familiarize ourselves with the great improvements of the day, chief among which we must regard Barnum's Rubber Dam.

[From the Monthly Review of Dental Surgery.]

IMPERFECT TEETH AND ZONULAR CATARACT.

Being the Substance of Observations at the Pathological Society, by JONATHAN HUTCHINSON, F.R.C.S., Surgeon to the London and Royal Ophthalmic Hospitals.

For some years past it has been a matter of general knowledge amongst ophthalmic surgeons, that, when children are the subjects of cataract, they usually show also badly developed teeth. I do not know with whom this observation originated, but it is acknowledged in most of our standard works. By some, the malformations have been supposed to be connected with inherited syphilis; and by others they have been associated with rickets and with general defects of development. My object in the present paper is to endeavor to give a little more precision to our knowledge in respect to the coincidence of these conditions. In attempting to do so, it is necessary first to state that I believe that imperfect teeth are, as a rule, met with in connection with one form only of the cataract of childhood. The form to which I allude is known as the "lamellar," or "zonular" form, and is very peculiar. In it, neither the nucleus nor the peripheral part of the lens is opaque; a thin layer of fibres, at a greater or less distance from the nucleus, and completely surrounding it, being alone involved. The defect is compatible with very fair vision, and is often not detected

until the child attempts to learn to read, sometimes not even till adult life. It is, I believe, almost invariably symmetrical, and is in a large number of cases quite stationary. It is not associated with any special diathesis, and it is very exceptional to meet with it in more than one member of a family. All these facts would suggest that it is probably the record of some temporary disturbance in the nutrition of the lens, rather than the result of any permanent peculiarity in the patient's state of health. It may be added, in support of this view, that lamellar cataract has not, I believe, ever yet been recognized at the time of birth, but is generally discovered at earliest during the first few years of the child's life. The *congenital* cataract belongs probably to a wholly different category, and is not lamellar. Whilst the congenital forms are often attended by other defects in the development of the eye, and with very imperfect vision, the lamellar opacity is, I believe, as a rule, the only defect to be found in the organ.

I must next describe the kind of defect in the development of the teeth which it is usual to meet with in connection with these curious cataracts. It is wholly different from that met with in congenital syphilis, and consists not so much in alteration of the form of the teeth as in defective development of the enamel. It is very often met with in association with the malformations which characterize hereditary syphilis, and hence probably some of the confusion which has resulted. The incisors, the canines, and the first molars, are the teeth which suffer most; and as a rule, with but very few exceptions indeed, the bicuspids escape entirely. The contrast between the clean, white, smooth enamel of the latter, and the rugged, discolored, spinous surface of the first molar, is often very striking. The first molars may, indeed, be counted as the test teeth as regards this condition, just as the upper central incisors are in that which is due to syphilis. In these teeth it occurs equally in both jaws. They are sometimes affected when all the other teeth escape, and I believe they never escape when the others suffer. I have been speaking throughout of the *permanent* set of teeth: for here, as in syphilis, although the temporary teeth often show unsoundness, they do not, I believe, exhibit any changes upon which it is safe to rely for purposes of diagnosis. The drawings which I hand round will convey a good idea of the kind of defect which is meant. They show the incisors and canines in various degrees pitted, dirty, and broken, often presenting very sharp edges, and sometimes often spinous. In some cases, a horizontal line crosses the crown of the incisors and canines at one level, the part of the tooth below the

line being narrower from before, backwards, sharp and broken. Non-development of enamel, and erosion of the exposed dentine, appear to be the essential features.

In the first molar it is usually the surface alone which is affected, the sides of its crown being often covered with good sound enamel, whilst its surface is denuded, brown, and rugged.

I must next state that, although lamellar cataracts are generally attended by defect of teeth, yet the coincidence is not invariable. I have before me the notes of three cases, characteristic examples of lamellar cataract, in which the permanent teeth are stated to have been quite sound. The converse statement, that these peculiarities of teeth are often met with in patients who have not lamellar cataract, is a fact with which all will be familiar. In the face of these facts, it becomes difficult to entertain the hypothesis that there is any direct correlation between the nutrition of the lens and that of the permanent teeth, by which the coincidence adverted to might be explained.

Some years ago, Professor Arlt, of Vienna, made the important clinical observation that those who suffered from lamellar cataracts usually had the history of attacks of convulsions during early periods of infancy ; and my belief is, that it is in connection with this fact that the dental defects are to be explained. As the result of a considerable amount of inquiry amongst those whose teeth presented the peculiarities described, my conclusion is, that the defects generally result from attacks of inflammation of the gums occurring in early infancy, and that amongst the causes of such stomatis, mercury holds by far the chief place. There seems reason to believe that in a large number of cases in which infants suffer from fits, mercury is given, and not unfrequently in large and repeated doses. I believe that it also enters into the composition of some of the most popular teething-powders.

My suspicion is, then, that when malformed teeth are met with in connection with cataract, they prove only that the patient has taken mercury in infancy, at a period when the enamel of the teeth was undergoing calcification. On this supposition we have a ready explanation of the order in which the teeth suffer, since it is precisely that of their priority of development. A very considerable collection of facts justifies me in the inference which has just been stated. Of late years, in cases of lamellar cataract I have always made it a rule to examine the teeth, and to inquire as to the history of fits, and as to the measure of treatment to which the patient was subjected in infancy. The connection between fits and cataract seems almost universal ; that between

cataract and malformed teeth general, but with marked exceptions: whilst, when the cataracts and malformed teeth are found together, it is very exceptional, provided the mother of the patient can be seen, not to obtain testimony as to the treatment of the fits by means of mercury. Of course, in some cases, the evidence on the latter point is either not forthcoming, or imperfect, but in many it is most strong.

I wish it to be distinctly understood that nothing which I have stated above has any claim to novelty, excepting, perhaps, the attempt to explain the connection between the different conditions mentioned. It is more than ten years since Arlt published his observations respecting the connection between fits and lamellar cataract; and, exactly ten years ago, Dr. Davidsen, then a student at Zürich, embodied the views of Professor Horner of that university in an inaugural thesis, in which most of the questions which I have discussed are entertained. I was not aware of the existence of this thesis (which was never published) until a few months ago, when it was obtained for me by the kindness of my friend Dr. S. L. Frank. Dr. Davidsen arrives at conclusions very similar to my own on most subjects, excepting the possible influence of mercury in producing the deformities of the teeth. This he does not even discuss, but speaks throughout of the dental defects as characteristically those of rickets. His table of cases does not place the coincidence between convulsions and lamellar cataract in such a strong light as do the facts collected by Professor Arlt, and my own. It is obvious, however, that a considerable margin must be left here for cases in which no trustworthy history of the patient's infancy was obtainable. Of these, Dr. Davidsen makes no mention, but he appears to count all cases in which no history of fits was given him as if their absence had been proved; and as most of his patients were adults, a serious source of fallacy in the calculation of percentages is here introduced.

Professor Horner has favored me, through Dr. Frank, with the statistics of seventy-eight cases observed by himself. In these he found a history of convulsions in 76 per cent., deformities of the teeth in 85 per cent., asymmetry of the head in 35 per cent., imbecility in 2 per cent., and rachitic malformations of the extremities in 4 per cent. The remark which I have just made as to the difficulty of obtaining accurately the history of the patient's infancy applies also to these percentages, and the 76 per cent. with history of convulsions must be distinctly understood to mean that, in this proportion, convulsions were proved, whilst probably they were by no means disproved in all

of the remainder. Professor Horner, who has given great attention to the subject, still believes in rickets as the cause of the dental malformation, and does not think that the hypothesis of mercurial treatment as the cause would hold good in Switzerland.

Although it seems to me probable, as already stated, that the convulsions stand in the relation of cause to the cataract, and the mercury given for the convulsions in that of cause to the dental malformation, yet I by no means wish to imply a belief that these associations are invariable. Certain apparent exceptions occur which require further investigations before we are justified in entertaining confident opinions on these points. Thus, I have several times seen sets of teeth which I should have considered characteristically mercurial, in cases in which all history of drug treatment in infancy was denied; and it must be admitted to be quite possible that other forms of stomatis will produce similar results. There are also certain rare cases in which zonular cataracts are met with in several members of the same family in the same or in different generations, and in some, at least, of these, I believe that there is no history of convulsions, and that the teeth are not malformed. Upon the peculiarities which attend this class of cases, however, more detailed information is required.

In reference to the suggestion of the Zürich investigators, that the peculiarities in the teeth, in the skull-bones, and in the general development, are all due to rickets, I must be allowed to say that it is as yet wholly unproved. I am not aware that any author has described what are so freely spoken of as "rachitic teeth," if that term be applied as it is by Dr. Davidsen, to the permanent set. Professor Vogel, of Dorpat, in his work on *Diseases of Children,* states, in reference to the effects of rickets on the teeth, that "as the disease disappears before the second dentition commences, these phenomena are not observed in the permanent teeth." Yet it is upon the state of the permanent teeth almost solely that the diagnosis of rickets in the Zürich *clinique* is based; for in only 4 per cent. did Professor Horner find evidence of rachitic malformation in the extremities. The irregular formation of the skull, defects in symmetry of the face, and mental peculiarities when present, are perhaps quite as easily explained by reference to the preceding attacks of convulsions as by the hypothesis of rickets.

By way of summary I think it may be stated—

1. That it is exceptional to meet with lamellar cataracts, excepting in association with an imperfect development of the enamel of the teeth; but that definite exceptions, in which the teeth are quite perfect, do occur.

2. That the kind of defect observed in the teeth consists in absence of the enamel, and is shown in the incisors, canines, and first molars of the *permanent* set, to the almost invariable exemption of the præmolars. That, for purposes of diagnosis, the first molars are by far the most important, and may rank as the test teeth, since they not unfrequently show the defect when the others escape.

3. That it is highly probable that the defects in the development of the teeth are usually due to the influence of mercury exhibited in infancy; although it is quite possible that other influences, attended perhaps by inflammation of the gums, may occasionally produce similar results.

4. That teeth of the kind alluded to are met with very often in persons who are not the subjects of zonular cataract.

5. That the very important observation made by Arlt, that the subjects of lamellar cataract have usually suffered from convulsions in infancy, is fully borne out by further examination; and that it is very unusual to find lamellar cataract without such history.

6. That it is probable that there is a direct connection between the occurrence of convulsions in infancy and the development of lamellar cataract.

7. That, whilst there is every reason to believe that the defective teeth which are met with in connection with lamellar cataract are the results of mercury, the evidence seems opposed to the belief that the lenticular opacity is also due to the influence of the drug. The great frequency of mercurial teeth without lamellar cataract, and the not very infrequent occurrence of lamellar cataract without mercurial teeth, are opposed to this view.

8. That the very frequent coincident occurrence of lamellar cataract with defective teeth is to be explained by reference to the frequency with which mercury is given for the treatment of convulsions in infancy.

9. That there is no reason whatever for supposing that lamellar cataracts have any connection with hereditary syphilis.

10. That, whilst it is certainly true that lamellar cataracts are commonly met with in young persons who show general defect of development, short stature, ill-shaped heads, defective intellect, dwarfed lower jaw, or other physiognomical peculiarities, yet there is seldom any proof of the existence of rickets; whilst it is quite possible that the peculiarities mentioned may be due to the disturbance of the nervous system in infancy in connection with the convulsions.

11. It is very important to distinguish between mercurial teeth and

syphilitic teeth, and the peculiarities presented by each usually render this easy ; the two are, however, as might have been expected, not uncommonly met with together.

SLEEP, AND HOW TO SECURE IT.

Dr. Frank Buckland, in a recent article on this subject in *Land and Water*, takes the ground that it is natural for man, like other animals, to sleep soon after eating. The following passage will be indorsed by all who are in the habit of after-dinner naps or late suppers :

The human frame cannot do without sleep. I believe the reason is that the mysterious property—for want of a better name we call it "vital energy"—gradually leaks out during the day. During sleep, the machinery of the body, especially the brain, becomes recharged with it. The cause of not being able to sleep—I write now of people in good health, and hard workers with their brains—is that the brain cannot, so to speak, "go down," but it continues to act, more or less. My father, when writing the Bridgewater Treatise, had his own way of working. He was an excessively busy man during the day, and had only the night hours in which he could write. He generally dined at seven o'clock, and immediately after dinner went to sleep for two or three hours. He then got up, and worked on till two or three in the morning. Just before retiring to rest he took some light pudding, or a sandwich, with cocoa or milk. Thus he always slept well, as the blood was diverted from the brain to the stomach.

I have no hesitation in saying that the proper thing to do is to go to sleep immediately (or at least very soon) after the meal of the day. All animals always go to sleep, if they are not disturbed, after eating. This is especially noticeable in dogs ; and the great John Hunter showed, by an experiment, that digestion went on during sleep more than when the animal was awake and going about. This is his experiment : He took two dogs and gave them both the same quantity of food. One of them was then allowed to go to sleep, the other was taken out hunting. At the end of three or four hours he killed both these dogs. The food in the stomach of the dog which had been asleep was quite digested ; in that of the one which had been hunting, the food was not digested at all.

The following is interesting as an anecdote of an eminent man, and worth noting also for its own sake :

I well recollect the late Dr. Wilberforce, then Bishop of Oxford, telling my father, then most actively engaged as Dean of Westminster, of his patent way of going to sleep. It is better than the old-fashioned prescription of watching sheep jumping through a hedge one after another, ships sailing out to sea, etc. The bishop's prescription was to *repeat very slowly the vowels A E I O. In doing this they were to be faintly pronounced with each inspiration and expiration.* It will be found easy to do this without moving the lips, but the vowel U must not be pronounced, for to do this the muscular action of the lips necessarily takes place, and sleep comes not. I advise my readers to try this plan.

Farther on the writer gives a prescription for want of sleep, which he has himself tested :

I now venture to suggest a new but simple remedy for want of sleep. Opiates in any form, even the *Liquor opii sedat.* and chlorodyne, will leave traces of their influence the next morning. I therefore prescribe for myself, and have frequently done so for others—onions ; simply common onions raw, but Spanish onions stewed will do. Everybody knows the taste of onions ; this is due to a peculiar essential oil contained in this most valuable and healthy root. This oil has, I am sure, highly soporific powers. In my own case they never fail. If I am much pressed with work, and feel I shall not sleep, I eat two or three small onions, and the effect is magical. Onions are also excellent things to eat when much exposed to intense cold. Mr. Parnaby, Troutdale Fishery, Keswick, informs me that when collecting salmon and trout eggs in the winter, he finds that common raw onions enable him and his men to bear the ice and cold of the semi-frozen water much better than spirits, beer, etc. The Arctic Expedition, just now about to start, should therefore take a good stock of onions. Finally, if a person cannot sleep, it is because the blood is in his brain, not in his stomach ; the remedy therefore is obvious : call the blood down from the brain to the stomach. This is to be done by eating a biscuit, a hard-boiled egg, a bit of bread and cheese, or something. Follow this up with a glass of wine or milk, or even water, and you will fall asleep.

A chiropodist announces on his business cards that he has "removed corns from several of the crowned heads of Europe."

PRESERVING PLASTER CASTS.

Prizes for a new method of preserving plaster casts have been offered by the Prussian Government. They are two in number. The first is of three thousand marks—a mark being about equal in value to an English shilling. The second is ten thousand marks. The first prize is offered for the discovery of a new method of cleansing plaster casts, &c., and the second for the invention of a new material possessing the advantage of plaster, but which will not deteriorate by repeated washings. Competition appears to be open to inventors in all parts of the world.

The first prize of three thousand marks is offered for a method which will give plaster casts the power of resisting periodically repeated washings, without injuring in the least the delicacy of the form or the tint of the plaster.

Special Conditions.—(*a*) The method must be applicable, in equal degree, to all kinds of plaster occurring in trade, and must not diminish the hardness of the cast. (*b*) In order to entirely preserve the delicacy of the form, those materials are absolutely excluded which do not soak into the plaster. (*c*) It is not necessary to preserve the original color of the plaster ; a yellowish tint, or any warmer tint may be allowed ; but the evenness of the color is, at any rate, indispensable. (*d*) Plaster casts prepared according to the method must stand repeated washings with soap and lukewarm water. (*e*) The method must be applicable to plaster casts of any size and shape. (*f*) Competitors for this prize are to prove the practicability of their respective methods by sending samples ; and if desired, by preparing casts placed at their disposal.

The second prize of ten thousand marks (about £500) is offered for a material for making casts of art works possessing the advantages of plaster, but which, without any special preparation, will not deteriorate by periodically repeated washings.

Special Conditions. — (*a*) The new material must easily allow castings in original moulds without their becoming more injured than with plaster, and it must reproduce the mould as exactly as plaster. (*b*) It is not required that the material should have the color of plaster ; a yellowish tint, or any warmer tint may be allowed, but the evenness of the color is indispensable. (*c*) The solidity of the material must not be less than that of plaster, so that it may be used for the largest casts. (*d*) Casts made of this material must stand repeated washings with soap

and lukewarm water. (*e*) The price of the material must not considerably exceed that of plaster, and the price of the moulds for casting must likewise not considerably differ from that of plaster moulds. (*f*) Competitors are to prove the practicability of their material by sending samples in applied and unapplied states, and also to give proof, if required, by the actual execution of casts.

General Conditions referring to both these Prizes.—The ministers reserve to themselves the nomination of a committee of experts, in order to examine the consignments which may be received. Competitors are to send with their consignments sealed envelopes, provided with mottoes, and containing the names of the senders. On the outside of these envelopes also is to be written the address to which the returned samples or any communications are to be sent. The consignments which have been found to correspond with the conditions stated above will become the property of the government, and the names of the successful competitors will be published. The remaining consignments will be returned to the addresses given on the envelopes. Competitors are to forward their consignments to the Royal Prussian Ministry of Public Worship, Instruction and Health (Königl. Preussisches Ministerium der geistlichen Unterrichts, und Medicinal Angelegenheiten), not later than 31st December, 1875.—*American Artisan.*

ENGLISH DENTAL COLLEGE EXAMINATIONS.

As a matter of interest and of information to the students in our Dental Colleges and to the younger members of the profession, we give, from *The Monthly Review of Dental Surgery,* lists of questions given at recent examinations in the Royal College of Surgeons of England and in the London School of Dental Surgery.

Royal College of Surgeons of England.

EXAMINATION FOR DIPLOMA IN DENTAL SURGERY.

June 22, 1875. 2 to 4 o'clock, p.m.

N. B.—The Candidate is required to answer at least one of the two questions both on Anatomy and Physiology, and on Pathology and Surgery.

ANATOMY AND PHYSIOLOGY.

1. Give the dissection necessary to display the Pterygoid Muscles. Describe their attachments and action ; and state whence they receive their vascular and nervous supply.

2. Describe the structure, relations and functions of the soft Palate.

PATHOLOGY AND SURGERY.

1. Describe the different methods of excising a portion of the Tonsil; and state under what circumstances this operation may be required.

2. Mention the several causes, and describe the symptoms and treatment of Abscess of the Antrum.

DENTAL ANATOMY AND PHYSIOLOGY, AND DENTAL SURGERY.

June 22, 1875. 5 to 8 o'clock, p.m.

N. B.—The Candidate is required to answer at least two out of the three questions, both on Dental Anatomy and Physiology, and on Dental Surgery.

DENTAL ANATOMY AND PHYSIOLOGY.

1. State the different stages of growth in the development of a canine tooth and a molar tooth, from the commencement of the calcification of the cusp or cusps, to the completion of the fang or fangs.

2. From which of the embryonic oral structures is the enamel developed? What is the form of the enamel prisms? Describe their arrangement on the crown of a molar tooth; and explain the advantages of such an arrangement.

3. What are the soft structures connected with the permanent teeth after their complete development? Enumerate the histological elements which enter into their composition; and state how they are arranged.

DENTAL PATHOLOGY AND SURGERY.

1. Give examples of reflex disturbance in relation to irritation connected with the teeth during their eruption; and explain fully the pathology of reflex nervous action.

2. Enumerate and briefly describe the several casualties that may arise in tooth extraction.

3. Describe the different modes of treating inflamed and exposed tooth-pulp.

London School of Dental Surgery.

The following Questions were Set at the recent Examinations.

June, 1875.

DENTAL ANATOMY AND PHYSIOLOGY, HUMAN AND COMPARATIVE.

(Lecturer, C. S. Tomes, Esq.)

1. Describe briefly the structure of Dentine and Vasodentine.

2. Of what parts do Enamel Organs consist? Which of these parts are most essential, and what becomes of each part?

3. What is meant by (1) "Adaptive Modification?" Illustrate your answer by reference to the dental apparatus of Snakes. (2) "Representative Species?" Illustrate your answer by reference to the definition of any animals which may occur to you.

4. Give examples of Teeth which are applied to purposes other than the preparation of food.

5. Define "Incisors," "Canines," "Premolars," and "Molars." Why is it impossible to frame perfectly satisfactory definitions of these several kinds of Teeth?

6. In what manner, and at what period, do the Tooth-germs of the permanent Teeth originate?

7. What are "Diphyodonts," "Gubernaculum," "Lines of Schreger," "Alveolo-dentar Membrano," "Nasmyth's Membrane," "Huxley's Membrane?"

DENTAL SURGERY AND PATHOLOGY.

(Lecturer, S. H. Cartwright, Esq.)

1. Describe and give the treatment of various diseased conditions of the Dental Pulp. Give the indications, general and local, for preserving or destroying it when exposed, explaining the operations undertaken for either purpose, and the subsequent treatment of the Tooth.

2. Give *general* rules for the Surgical treatment of the *temporary* Teeth in anticipation of possible irregularity in the second denture, and of the *permanent* Teeth when irregularity has occurred. Illustrate your answer with typical examples.

3. How would you determine whether Convulsions occurring during Teething were dependent upon Dental irritation or upon disease of the brain? What conditions exist in the spinal and cerebral systems to render them so frequent at this period, and what is the physiological explanation of the phenomena observed?

4. What are the local and constitutional causes of Caries? Suggest plans of treatment calculated to counteract such causes as you may specify.

5. Classify the tumors known under the name of Odontomes. How is their diagnosis from other enlargements of the maxillæ to be effected, and what is their pathology and treatment?

6. A patient applies to you with an unhealthy ulcer upon the side of his tongue—To what causes may it be due? Explain how you would diagnose its character, and give the indications for treatment in each condition you may mention. [Reference might be made to cases lately treated in the Hospital.]

7. Mention and give the symptoms, pathology and treatment of the chief diseases attacking the mucous membrane of the mouth of the child.

8. Explain the uses and therapeutic action of Iodine, Chlorate of Potash, Carbolic Acid, Creosote, Tannin, Alcohol, and perchloride of Iron in Dental Surgery.

Write a prescription for—

a. A Mixture to be used in alveolar hæmorrhage when uncontrolled by local means.

b. An Astringent Wash to be used in cases where the gums are spongy and tumid.

THE PRIZES WERE AWARDED AS FOLLOWS.

Dental Anatomy and Physiology.

1st Prize........................Mr. H. B. Mason.
2d Prize........................Mr. J. H. Whatford.
Honorable Mention.............Mr. W. H. Fox.

Dental Surgery and Pathology.

1st Prize........................Mr. H. B. Mason.
2d Prize........................Mr. W. S. Bennett.
Honorable Mention.............Mr. J. H. Whatford.

TO OBTAIN ABSOLUTE ALCOHOL.

By J. LAWRENCE SMITH, of Louisville.

This substance, as obtained in commerce, very seldom marks more than 98 or 99 per cent. It is, however, not unfrequently made in our laboratories, and when this is done the usual method is employed of pouring strong alcohol on lime until the lumps of lime are covered. This method of proceeding gives a thick magma, which, when heated over a water-bath, allows the alcohol to pass over but slowly, and much of the alcohol is lost from the impossibility of the heat penetrating the thick mass. The method I follow differs from this in no way except in the quantity of lime employed; using the smallest quantity of lime necessary to abstract all the water, it is surprising how completely the lime will perform its function in this respect. Take, for instance, one

litre of alcohol of 94 per cent.; this contains about 60 grammes of water. If to this be added 120 grammes of good and fresh burnt lime, requiring about 40 grammes of water to convert it into hydrate, actual experiment proves that when kept in contact with the alcohol a sufficient length of time, it accomplishes this absorption of water, and the alcohol decanted from the precipitated lime will be fully 98 per cent.

Operating upon this fact, I have been long in the habit of supplying myself with alcohol of 98 and 100 per cent., by proceeding in the following manner: I have in my laboratory three or four two-litre bottles, into each of which I place 1½ litre of 94 per cent. alcohol, the strongest alcohol sold in commerce; to this is added 180 grammes of fresh burnt lime of the best quality, broken up into a coarse powder. These bottles are set aside on the shelf and agitated from time to time; the oftener this is done the more rapidly will the reaction be accomplished. A week or ten days will usually suffice, when the bottles are allowed to remain at rest, and the hydrate of lime will settle in a few days, and by a siphon two-thirds of the original alcohol can be drawn off free from lime, which marks 98 per cent. alcohol, and when filtered, and 50 c.c.m. evaporated to dryness, there will be left only the merest trace of lime, less than one-half milligramme. But, of course, redistillation is so simple that if we wish the alcohol at 98° it can be readily distilled over a water-bath. The magma remaining in the bottle, when distilled over a water-bath, furnishes the remainder of the alcohol about one-half per cent. higher.

When absolute alcohol is desired, take the alcohol just as it has been siphoned off or distilled from the magma, put it into a convenient flask for distillation, and to each litre add 120 grammes of lime in coarse powder, attach to a Liebig condenser inverted, so that the alcohol will run back into the flask when condensed; this is continued for an hour and a half or two hours. The condenser is then placed in its normal condition, and alcohol distilled over which will mark 100 per cent. Recently I have learned that there is a method adopted of making the absolute alcohol by one distillation, operating by the inverted condenser first, but in this process the amount of lime called for is the usual quantity, whereas I find that by reducing the lime to its minimum, and always having bottles ready to furnish 98 per cent. alcohol, the operation is facilitated, and the loss diminished. So that with the ordinary conveniences and appliances of the laboratory, that are always at hand to be mounted, I can, with fifteen or twenty minutes of *personal attention and manipulation*, obtain a litre or two of absolute alcohol. Of

course the time for the reaction of the materials and the distillation is not referred to, as this requires little or no supervision.—*American Chemist.*

NITROUS OXIDE IN TUBERCULOSIS.

Dr. C. W. Dawson reports a case of miliary tuberculosis, in which, after the failure of all ordinary remedies, nitrous oxide was used with most desirable results. Improvement was very slight at first, but steadily increased until complete recovery resulted. Cutaneous circulation resumed its vigor, muscles performed their functions with greater precision, the pulse became stronger and less frequent, appetite became voracious, weight increased, etc. The amount of gas taken was about five gallons a day at intervals.—*Am. Med. News*

FILLING TEETH.

[Miss Julia Clark, of Neosho, Wis., read the programme for the State Dental Convention, and then sat right down and wrote the following appeal :]

You gather again to discuss the profession,
And bring up the cases that trouble you most,
In bleaching and drilling, extracting and filling,
And each has a specialty none else can boast ;—

For one shows his teeth where he can't show his knowledge,
Objecting to *mallets* except in croquet ;
Another on *plaster* absorbs some attention,
Another *sticks* to his subject with plenty to say.

A treatment of abscess revealeth the matter,
In light of profession, sufficiently clear,
And *celluloid* virtues require your reflection,
While *pulps* in exposure elicit a tear.

Yet many lose *patience*, and long for plate filling,
Prepared in the dining hall over the way,
Agreeing with promptness in handling full purses,
That filling with gold is the surest to pay.

But have you no thought for the poor cringing victim,
Who pleads for your mercy in agonized tones?
Does not your guilty conscience in sleep e'er upbraid you,
In dreams of amalgam, or heart-rending groans?

A novice at dentistry comes with assurance,
  And calmly she treads on your velvety floor ;
But quickly recoils at the swift little driller,
  As through her incisors she growls "What a bore."

She, writhing in agony, craves nitrous oxide,
  (The use of the stuff you've long tho't a sin),
So you say, very blandly, "I'm sure you're but gasing"—
  Those vapory jokes are a trifle "too thin."

'Tis harder for patients to bear odontalgia,
  Than you cruel dentists have grace to suppose ;
You realize not that this curious dentine
  Is ever severest of physical foes.

Oh ! nightmares of terror are naught to this anguish,
  That racks the poor nerve of the quivering frame ;
And orthodox Hades, in torture excelling,
  To dental infliction is pleasantly tame.

I dreamed one night I was fastened forever,
  In a huge dental chair in the midst of a heath,
And all my life 'twas a ceaseless endeavor,
  To keep the rash dentists from filling my teeth.

Alas ! 'twas no dream ! the knife of the dentist
  Has entered the gates of enamel ajar,
And *Arm*, of *Æsthetic*, his readiest servant,
  Unlocked with her magic the golden bar.

In sorrow my dearest companions I've buried,
  And sadly have witnessed hopes fade away,
But never on earth have I suffered such anguish
  As when from my molars was cut the decay.

Oh ! then hear the cry of your suffering fellows !
  Scorn not my petition, their pitiful prayer ;
With gentle persuasion soothe fears so depressing,
  And they will remember your merciful prayer.

NOTES.

Convention of Dentists.

LONG BRANCH, July 8.—At the fifth annual meeting of the New Jersey Dental Society, to-day, at the Ocean Hotel, the annual address was delivered by the President, Dr. G. C. Brown, of Mount Holly. The meeting was interesting and instructive. In addition to the essays read and discussed, subjects of importance to the profession were presented. The Board of Examiners was in session during the meeting of the Society and accepted many practicing dentists in accordance with the requirements of the act to regulate the practice of dentistry. The following were the subjects of the essays read: "Operations Hurriedly Made, and their Opposites," by Dr. T. B. Welsh, of Vineland; "Dental Education," by Dr. C. S. Stockton, of Newark; "The Cause and Cure of the Absorption of the Alveolar Process," by Dr. J. R. Goble, of Hoboken; "The Best Mode of Inserting Partial Sets of Teeth," by Dr. J. Hayhurst, of Lambertville; "Amalgara," by Dr. E. F. Hanks, of Jersey City; "Celluloid vs. Rubber," by Dr. Leo H. Delange, of Bordentown.

The following officers were elected for the ensuing year: President, Dr. C. S. Stockton, of Newark; Vice-President, J W. Scarborough, of Lambertville; Secretary, Charles A. Meeker, of Newark; Treasurer, Wm. H. Dibble, of Elizabeth.

A serenade was given last evening to the Society by the band of the Ocean Hotel.

Dr. G. C. Brown, the retiring President, moved a vote of thanks to the Messrs. Leland, proprietors of the Ocean Hotel, after which the meeting adjourned. The next annual meeting of the Society will be held at Atlantic City, on the second Tuesday in July, 1876.

Annual Meeting of the Missouri Valley Dental Society.

Nebraska City, July 28, 1875.

The annual meeting of the Missouri Valley Dental Society, was held at the office of Dr. C. Thomas, on Wednesday, July 28, 1875.

President Dr. C. Thomas in the chair.

The election of officers for the ensuing year resulted as follows:

President, Dr. J. W. Chadduck; Vice-President, Dr. W. F. Rosman; Secretary and Treasurer, Dr. F. M. Shriver.

EXECUTIVE COMMITTEE — Drs. C. Thomas, J. F. Sanborn, J. W. Chadduck.

COMMITTEE ON MEMBERSHIP—Drs. J. F. Sanborn, F. M. Shriver, E. I. Woodbury.

On motion the Society adjourned to meet at Omaha, Neb., on the fourth Tuesday in July, 1876.

F. M. SHRIVER, *Rec. Secretary.*

Parasite in a Child's Mouth.

At a meeting of scientific men lately held in New Brunswick, New Jersey, Prof. Lockwood exhibited a thread-worm which he said was sent him by a student of Rutgers College, two years ago, who found it in an apple which he was eating. It looked so like an animal parasite that the professor was puzzled to fix its character. He stated that Prof. Leidy had recently described before the Academy of Natural Sciences, at Philadelphia, the same worm, also taken from an apple; who also said that this worm was a parasite of the larva of the codling moth, whose grub, or larva, as is well known, infests the young apple, feeding inside of it, and thus causing it to fall from the tree to the ground, when the larva leaves the

fruit and enters the ground, in which to pass its pupa state. Thus the worm, whose name is *Mermis acuminata*, was really an animal parasite, sustaining its own life apparently, by a vegetable diet, after the death of the larva codling, either by absorption or its own consumption of it. Dr. Leidy called the attention of the Academy to the fact that twenty-five years ago he described before them the same entozoön taken from the mouth of a child. At that time he was ignorant of the origin of the parasite. It now seems fair to infer that the child had been eating an infested apple, and that the worm had a second time changed its *nidus* for that of the child's mouth.

Japanese Dentistry.

A remarkable specimen of Japanese Dentistry was presented by Dr. Hatch to the Oregon Dental Society at their recent session ; a set of teeth made of actual ivory, inserted in a base carved out of smooth, hard wood. The teeth are inserted with a wooden dowel. The inserted place of the molars is supplied with some rough iron tacks driven in the wooden base. They exhibit a good deal of patient whittling, are clumsy and awkward, yet they would be a great help to an aristocratic "John" in masticating his rice.—*San Francisco Chronicle.*

Infrequency of Pulse.

A case of extraordinary infrequency of pulse was recently mentioned by Mr. Pugin Thornton, at a meeting of the Clinical Society of London. The subject was a woman, twenty-nine years of age, thin and anæmic, and suffering from severe inflammation of the larynx, for which the operation of tracheotomy was performed. Just before the operation her pulse was 40, and after it she had an epileptiform attack. She was discharged from the hospital much improved, but was readmitted soon afterward. Her pulse was then found to be beating only at the rate of 16 per minute, the pulsations being strong. The frequency increased slowly for a month, when it was 20, and soon afterward it was again 40. This was some two years ago. Her pulse is now 48, and the patient has grown stout. Normally, the number of pulsations per minute differs at different periods of life : at birth, it is about 135, at the age of seven, from 80 to 85 ; in adults, 70 to 75 ; in old age, from 50 to 65. In females, the pulse is quicker than in males.—*Popular Science Monthly.*

Ornamentation of Copper and Bronze.

A new mode of ornamenting bronze or copper work is described as follows : After the object has received the desired form, the drawings are made with water-colors, the body of which is white lead. Those portions of the surface which are not painted are covered with varnish. The article is then placed in dilute nitric acid, whereby the paint is dissolved, and the surface of the metal is etched to a certain depth. The article is then washed with water, and immediately placed in a silver or gold bath, and a layer of the precious metal deposited by electricity on the exposed portions. When the latter operation is finished, the varnish is removed, and the whole surface ground or polished, so that the ornamented portion is just even with the rest of the surface. A specially fine effect is obtained by producing a black bronze of sulphuret of copper on portions of the surface between the silver ornaments. A copper vase then has three colors, black and white drawings on a red-brown ground of suboxide of copper.—*Popular Science Monthly.*

Impermeable Silk Paper.

R. Jacobson floats silk paper for a short time on a water solution of gum lac and borax. By this treatment the paper becomes translucid, and impermeable to water and fatty substances.

JOHNSTONS'

Dental Miscellany.

Vol. II.——*OCTOBER, 1875.*——No. 22.

SUCCESS OR FAILURE IN DENTAL OPERATIONS CHEMICALLY CONSIDERED.

Read before the Dental Society of the State of New York, by S. B. Palmer, M.D.S.

By a careful review of the discussions upon the subject of filling teeth, there is plainly set forth, two distinct modes of operating, each claiming to secure the same end—namely, the preservation of teeth. One takes a mechanical view of the operation, recommends a thorough preparation of the cavity, removal of all decayed or softened bone; tracing out every fissure, and thoroughly filling with a solid, moisture-tight gold plug, gold having the preference, on account of its freedom from oxydation, its cohesive properties, its intrinsic value, the opportunity its use affords in exhibiting the skill of the operator, also the relation which custom has established between first-class operations and remunerative charges. The other method is conducted upon the theory that the success or failure of every operation is determined by known or unknown laws in nature, which are unchangeable. The operator, therefore, knowing the fact, like a wise counselor puts his case on trial under the law which will render the desired verdict.

At our last meeting I presented a paper entitled, "Chemical and Galvanic Action upon Teeth, and the Materials used for their Preservation," the substance of which was a record of facts and observations induced by experiment, aided by the use of the galvanometer. As expressed in the Society, many of the points there set forth were new, and required more time and thought than could then be given to discussion. Thus, by request, the paper was published upon its

merits; not, however, without receiving marked attention. Individuals and local societies have freely criticised and discussed the subject, in many instances, in a manner so foreign to facts in connection with electrical science, that the absence of a reporter is not to be regretted. These discussions, however, have revealed the status of general comprehension in respect to chemical action; suggested new figures for illustrations, and the use of more simple language in explanations, while continued experiments and study has strengthened the position already taken.

The title of our former paper was, "Chemical and Galvanic Action upon Teeth, and the Materials used for their Preservation." The subject was treated upon the ground that chemical action is but a lower grade of galvanism, as the following quotation from the paper will show: "Many articles that we never thought of in connection with galvanism are found to be elements for batteries; in fact, chemical action and the electric current stand in the same relation to each other as do electricity and magnetism,—inseparable." In addition to this, other statements were made independent of any written authority upon the subject, not less true, however, if I am able to comprehend and record nature's revelations correctly.

Failing to comprehend this new doctrine, or perhaps feeling called upon to defend the good old way, Mr. Thomas Fletcher, of Warrington, England, wrote a severe criticism upon my paper, which was headed, "Chemical *versus* Galvanic Action on the Teeth," and proceeds, as he says, "to give the other side of the question." I am glad that the New York State Dental Society is not responsible for thus rendering—I will say rending the subject. To a chemist, this division will have little force in controverting the statements of the original production. In this criticism we have a warning not to adopt imported science upon mere statement.

Without an attempt to define or explain the rudiments of chemico-galvanic science, we start our investigations upon the statement of well known laws and facts, relating to action as witnessed and experienced in the oral cavity. We occasionally meet with persons whose whole system appears to be in a normal condition. They know nothing of gastric or acid irritation; the fluids of the mouth being alkaline, soon return to a state of neutrality after the introduction of acids of any kind, and thus the teeth are generally kept in a state of equilibrium, with little demand for the service of a dentist.

Teeth thus favorably located when properly filled with gold, may

be regarded as preserved from further advancement of decay. Also teeth imperfectly organized and more exposed to acid irritants, may be correspondingly protected by like treatment; but in this divergence from the normal condition, there is a point reached where a gold plug ceases to be a virtue, nay more, a positive evil, no matter by whom inserted, how skillfully and thoroughly the operation is performed, whose preparation of gold is used, or in what particular form it is introduced, failure is the verdict of the infracted law.

> "The doom was written, the decree was past
> Ere the foundations of the world were cast."

There is a principle back of the causes usually attributed to decay in teeth; when this shall be understood it will not only furnish a short rule by which to solve this problem, but one applicable to the decomposition of all matter. We will endeavor to explain our meaning by a figure, thus:

Allow that matter is a body, of which electricity is the soul or life.

This life exists everywhere in a free or combined state, above, below, within.

It enters into every compound, mineral, vegetable or animal, and in a state of equilibrium will there remain in a latent state for ages.

If by any means this electrical equilibrium becomes unbalanced, either by increase or diminution, the effect is visible upon the body or compound.

Apply this rule to a tooth; how long would a tooth last, placed in a cabinet or dry place? the age of mummies is not sufficent to answer the question. Replace such a tooth in a mouth where chemical action is going on, as in life, and it follows in the usual course of decomposition.

What are the agents most liable to effect these changes? attrition, thermal changes, chemical and galvanic action.

As we are not considering the general causes of decay in teeth, we drop attrition and thermal changes, and attempt to show the influence of the various articles in use for fillings, in promoting chemical action. First we must remember that the nature of the fluids in the oral cavity and the teeth are in harmony—both alkaline.

The introduction of acids temporarily change this equilibrium; immediately following there is an increased flow of the fluids, and the normal condition is again restored without material injury. By prolonged or constant acid action, either involving the whole set, or at a

given point, as in a cavity or beneath a clasp, the exposed portions will be decomposed, according to the density of the structure or intensity of the action. To be more definite we will leave out chemical action as induced by acids taken into the mouth, and confine our investigations to the action between a gold plug and a tooth.

One of the arguments used in criticising the paper was that gold, being an elementary body, is not changed itself, and therefore imparts no change to the tooth. What are the facts? We might reason that because a fan is no cooler than the air around it, there could be no benefit derived from its use. The fan in motion becomes an instrument causing circulation, driving away the heated air from the person, supplying its place by cooler currents. So with a gold plug in a tooth, there are conditions in which, like a fan, it becomes an agent of circulation and promoter of chemical action, decomposition and destruction of tooth structure.

What are the conditions? Simply admission of moisture between the plug and walls of the cavity, a condition necessary to prolong chemical action.

Thus the success in most cases depends upon the perfection of the operation—the exclusion of moisture and circulation of fluids, which are prerequisite to chemical action. So far the mechanical and chemical theories do not disagree in practice or results. Such are the attainments of some of our first-class operators that it is said, "The appliances of to-day are such that teeth ought to be so thoroughly filled as not to again decay."

If there are any present whose mechanical skill and attainments are such that they find no class of teeth that cannot be preserved with gold, be thankful and patient, while we try to help the great mass of dentists who are compelled to acknowledge failures.

It is with timidity that I find myself alone, presenting a theory or principle untaught in dental writing and unknown to the profession. I have this satisfaction, however: those who can save all teeth by the mechanical method, will not be hurt by this doctrine; those who are not so successful may be benefited thereby, and not less their patients.

I ask no further indorsement of the theory here advanced than facts which come under your observation in the discharge of your duties will substantiate. I am only endeavoring to account for facts which are so apparent in practice that longer ignorance would seem beneath the claims of a learned profession.

In the case of repairing a leaky cistern, wisdom would demand know-

ledge of the material of which the cistern is composed, and nature of the leak ; then call for carpenter, plumber or mason to make the repairs. A porous cement cistern would not be benefited by the carpenter or plumber ; only by the application of a chemical to fill the pores over the entire leaky surface.

So there are a class of teeth out of reach of mechanical preservation.

Six year molars—soft, porous, badly decayed teeth, as found in the mouths of young patients, and not unfrequently teeth with devitalized pulps—if filled with gold, any intelligent and observing operator must expect to repeat the operation at no distant day. We make the statement upon scientific principles, substantiated by facts, that tin, amalgam, oxychloride of zinc, and Hill's Stopping, for a time, and for reasons we hope to make plain, will better preserve such teeth.

Experiments prove that there is chemical action when in the mouth between the filling and the tooth.

I had rather speak well than ill of any person, so I here quote Mr. Fletcher's remarks in his criticism upon my paper of last June. "That there is a distinct action visible in a delicate astatic galvanometer between a plug of any material and the tooth may be granted ; also there is an appreciable current to be obtained from almost any two different substances, living or dead ; but I think it will be an easy matter to prove that this current in itself is no proof of destructive action going on under practical conditions." Here is an admission by the critic of the point I wish to establish. The presence of a current in all cases indicates chemical action, and chemical action between a plug and a tooth will tend to destroy either the tooth or the plug. I wish to agree with the critic as far as consistent, and again I use his language : "We will first take a tooth with a practically and theoretically perfect gold plug. Any operator will acknowledge that this is a safe protection, and that it will stand unchanged under ordinary conditions for an unlimited number of years." This is true in respect to the ordinary class of teeth, that is, the action admitted to exist, which is proof of decomposition of the dentine, is so slight that thirty or forty years may be required to cause a failure, and thus the truth or falsity of the law against gold is of little practical value ; but when we are called upon to apply our skill upon a poor foundation, self-respect and professional integrity demand that we make provisions for such results ; either reject gold when other materials will better meet the necessities of the case, or frankly tell the patient that the structure of the tooth is against permanent success.

The practical question is, What are the peculiar properties of gold

which in itself is not acted upon, that cause increased action upon the teeth; or in what respect does gold differ from the base metals which in a degree are antiseptic to decay in that class known as chalky teeth. As all understand, metals possess certain chemical or electrical properties and vary from each other in resistance to chemical action, in conductivity of electric currents, also in the nature of the currents; that is, they may be either positively or negatively electric. Some metals have acid reactions, others alkaline. Tables are given in Works on Chemistry where the metals are arranged in their order according to their electrical properties.

Faraday gives the following: Platinum, Gold, Mercury, Silver, Copper, Antimony, Bismuth, Nickel, Iron, Tin, Lead, Zinc. Between the extremes, when brought in contact with a fluid, there is found the greatest chemical action, consequently the strongest galvanic current; between any two nearest each other the action will be so slight that often a change in strength, or temperature, of the same fluid will reverse the order. A change from acid to alkali will also change the current with several of the elements. The practical question is, What properties does gold possess by which it can injure chalky teeth? In all this there is nothing new to a chemist. The articles mentioned are prominent metals, some of which figure in almost every galvanic battery where decided action and volume of electricity is required. Perhaps all matter, compound as well as simple, could be located in a list by comparing one with another. It is sufficient for this occasion to compare the materials brought in contact in the mouth; to do this we have to arrange our own table, as it introduces amalgam, oxychloride, and dentine, all compounds, and not found in any given table to my knowledge. The order is as follows: When tested in saliva, Gold, Mercury, Oxychloride of Zinc, Dentine, Tin, Amalgam, Zinc; the latter is added not as a material for fillings, but to represent the zero of the scale.

In a weak acid solution the order is changed. Gold, Amalgam, Oxychloride of Zinc, Tin, Dentine, Zinc.

Now let us look at the principle of action. First we accept the idea that all simple elements are in certain electrical conditions, or in other words hold a given quantity of positive or negative electricity in a latent state. In combining, either by chemical action or chemical affinity, this state of electrical equilibrium is unbalanced; the atoms, when liquidated or in a state of fusion, appear to be attracted according to an electrical law: opposites attract, like conditions repel. Though this statement in regard to chemical affinity is back of authority, we start

here with a principle, and ask you to follow it onward in a path which science has already made plain.

The principle is that, matter is endowed with either positive or negative electricity. That in all cases where matter is *decompossed* or *composed,* there is attending the process a positive and negative galvanic current. Also that the galvanic current is electricity of low resistance. And that chemical action and galvanic action are inseparable. Chemical action is constantly going on all around us in growth and decay of matter; the electricity evolved therefrom is enormous; yet, like the vapor which rises at noon-day, is unperceived. Galvanic action is chemical action conducted in a mechanically contrived cell for the purpose of collecting and utilizing the current. A single galvanic cell, though it be as large as a cistern, would give volume of current yet lack the intensity necessary to overcome resistance to work on long lines of the telegraph.

This, however, is one degree higher than the action going on so silently, and has been compared to boiling water in an open vessel where steam is generated and passes sluggishly away with little or no force. The next step may be reached, which is frictional electricity, in three ways: by the electric machine which produces the spark by friction. This has nothing to do with our subject and we dismiss it; another method is by the induction coil used in connection with the primary current; this too is not in the true line of ascent. A single cell of battery has a certain power to overcome resistance, and will work a single telegraph instrument with a few yards of wire very well, the addition of another cell does not increase the volume, but the power to urge forward the current through a longer line of wire; thus series of cells are used on the long lines; my object in mentioning this peculiarity is to trace the analogy between chemical action and frictional electricity, and ask where the word "*versus*" comes in. Every cell that is added increases the intensity of the current as it is termed, and renders it nearer to frictional electricity. The latter, though cheaper, cannot be used for telegraphing, owing to its power to overcome resistance, which enables it to jump the insulations of the wire rather than follow the many revolutions around the magnet. Thus it will be seen that a practical battery for telegraphic purposes should have fewer cups than would produce such energy. Through all these varieties of electric action one law obtains; in the matter which is undergoing change, in the current produced thereby, in frictional electricity, and in the magnet which comes in contact with the current may be found the same principle, viz.: that opposite poles attract each other.

By a test of the elements used for producing galvanic currents, those standing first on the list, platinum, gold, &c., produce the positive current which possesses the properties of an acid, while zinc and other low metals yield the negative or alkaline current. The application to a tooth is very simple. We have dentine as an element; its properties every dentist understands. Gold, which is second on the list as a conductor and negative element, is introduced as a plug. If a tooth is sufficiently dense to render it a non-conductor and the cavity is thoroughly plugged, all is right; as we depart from these conditions chemical action increases, the fluids which find access around or beneath a gold plug are by a chemical law decomposed and rendered acid, which is renewed according to the space allowed for circulation. The dentine, as a consequence, becomes irritated, the bone softened, and in time the plug loosened. This is a plain scientific rendering of chemical action, the cause of chagrin and failure of some of our finest operations. On the contrary, tin, amalgam and oxychloride of zinc reverse the current or stand in about the same electrical conditions as dentine. Instead of constant acid action, equilbrium is preserved, and thus the antiseptic properties of tin, lead, zinc, etc. consist in furnishing an antacid element directly in the cavity. We practice the same method when we recommend the use of prepared chalk to harden soft teeth. Castile soap or lime water would answer the same purpose, but for the short time it can be retained in contact. In order to preserve teeth we must arrest or prevent chemical action mechanically if we can, medicinally if we must, and I apprehend that science will yet teach that materia-medica is founded on the same principle; that the diagnoses of the coming physician will locate electrical disturbances in the body, as the electrician now does a leak in a submarine cable. Knowing the nature and location of the impediment to circulation he will upon this principle be able to stimulate nature's dormant forces by chemical action instead of by the withering electrical current from an induction coil.

In the writing of this paper we have no theories to establish or defend; in exchange with you I give my conclusions earnestly and honestly, drawn from observation and experiments, in search of a law by which to be guided in conducting my operation. The few remarks in application of the same law to materia medica are speculative, and not designed as matter for criticism. Another word of explanation as to the use of gold. The history of dentistry is sufficient to forewarn any operator against denouncing an established method or material, or recommending an unpopular one. What has been said against the action of gold,

or all that can be said in its favor, cannot change its nature or the facts. I am better prepared to judge for myself and my patients when not to use it. I would not fill front teeth with amalgam, yet I have seen cases where it would have been far superior to gold for their preservation. The cases are not numerous where gold excites chemical action, when circumstances dictate its use, in defiance of law, in restoring portions of wasted crowns. I apply it in harmony with the "golden rule," telling the patient as nearly as possible how long it may be expected to last. With such a statement, in case of failure, there will not exist a feeling of wrong, as we witnessed not long since when a clergyman called for advice respecting a slight pain experienced in an inferior bicuspid tooth which had been filled two years previous. The tooth had in it a large, beautiful, solid gold plug, inserted by a Western dentist of such acknowledged ability, that to mention his city would almost be a personality. The plug was loose ; nothing but a renewal of the operation could be relied upon. I could hope for no better results with gold, and did not choose to recommend amalgam. As the patient paid thirty dollars for the filling there was little trouble in referring the case back to the operator. The patient paid his fee with the expectation that the tooth would be preserved by that filling, the operator was either ignorant of the law which caused the failure, or performed the operation for the fee, regardless of its utility. If the cause of failure rested in the imperfection of the operation, this did not help the patient ; he paid dearly for an experiment.

In the selection of materials for fillings so low in the scale as frail teeth demand, care is necessary to avoid escharotic or poisonous effects in consequence of their combination with other elements. We see an example of this in the use of amalgam as formerly made from silver coin ; many such plugs are doing good service to-day ; like gold, their usefulness is determined by the structure of the tooth. Chemical action produces on such fillings either a black oxyde or a sulphide of copper. If the dentine is sufficiently dense to prevent this sulphide from coming in contact with the cartilage or vital portions all is well ; if not, as the color shows, the sulphide by capillary action advances, the vitality of the tooth is destroyed, and when the pulp is finally reached, that too falls a victim to the destroyer.

Tin seems the least objectionable of the metals ; this, however, fails in giving support to the frail walls of many teeth, and cannot always be used. Oxychloride of zinc, while its relations in general are all right for preserving a tooth from chemical action, is not proof against the same

action in its own compound; it cannot be relied upon except by careful watching. We are to look to amalgam and see what are its merits or demerits. The experiments of Dr. Cutler, the late Dr. Hitchcock, Dr. Bogue and others relate to its physiological and physical properties.

My investigations contemplate only its chemical properties. In the paper read at our last meeting, I stated in substance, that amalgam is a compound of various elements possessing different electrical properties, that it is desirable to have this compound chemically combined, rather than a mechanical binding together. I quote one sentence: "The property sought in an amalgam is plasticity. To secure this the process of combining must be completed after its introduction into the cavity. Any hasty compounding of the coarse material, by merely mixing in the hand, will surely result in decomposition of the plug and enlargement of the cavity." Again: "The importance of thorough amalgamation of the compound and cleanliness of the mouth cannot be ignored. With these requisites, amalgam may answer a purpose for which chemistry as yet has failed to give anything better." This was said previous to the experiments of Dr. Bogue and others.

In the choice of metals from which to make amalgam, the first thought would suggest fineness of the compound, as the thing most to be desired.

The same hasty conclusions would suggest premature extraction of deciduous teeth to prevent irregularities.

If an amalgam could be made of pure gold or platinum it would lose the antiseptic properties belonging to the lower grade of metals. The chemical test shows that amalgam now stands next to gold when the acid test is used. By test in saliva it is placed below dentine and tin. Pure mercury is well up in the scale. Gold and platinum are still higher. Tin is not below dentine, so that the electrical fineness, so to speak, are so far above the structure of the teeth that in acid secretions it is subject to the same objections as gold, though in a less degree. If the oxyde of zinc is a harmless compound, and the metal itself would combine with the others to preserve the right physical properties, zinc would reduce the compound to the standard of pure tin, and give more satisfactory results. Again: If the compound, as it comes from the crucible, is above mercury, nothing short of perfect amalgamation can prevent the mercury from becoming the positive element, or element to be acted upon: such plugs after exposure present a surface covered with fine pits all around the plug; next the enamel or dentine, may be seen evidences that the material is on the ragged

edge of dissolution. If the electrical conditions of the compound are equal, or below mercury, the latter will not leave the mass, because of its comparative fineness. The plug will not act upon the dentine because it will be in a state of equilibrium.

Gentlemen, I believe and practice the doctrine here set forth; it does not lead me to fill back teeth with amalgam, unless there is a demand for its use, under the law which governs me; I have endeavored to define chemical action as witnessed in the oral cavity, regardless of all opinions or prejudices respecting materials or modes of practice.

REPORT OF THE PROCEEDINGS OF THE AMERICAN DENTAL ASSOCIATION.

Fifteenth Annual Session, held at Niagara Falls, Aug. 3d, 4th, 5th and 6th, 1875.

SECOND DAY—MORNING SESSION.

The Association convened pursuant to adjournment, at 10 A.M.

Dr. John Allen's paper on the health of the dentist was still under discussion.

Dr. Taft said that everything bearing upon the health of the dentist should be kept in view. It is a fact that a few years since, many of the best men in the profession were broken-down men from a neglect of this matter, but of late some improvement has been made. Various things incident to the occupation of the dentist are injurious to health; caution is necessary that the health be not undermined by the confinement, the bad positions, and the noxious inhalations to which he is subjected. There is a constant and large expenditure of physical force; not exactly of the kind required in using the sledge-hammer, etc., but the holding of a steady hand requires an effort continued through a whole day, and the attention must be riveted upon the operation. Both physical and mental effort is required, and the result is a strain which, when prolonged, produces very great exhaustion. Other occupations require but one kind of effort. We must strive to prevent this from being carried to an extreme, by endeavoring to divert the attention by changing the occupation toward the close of the day to something wholly diverse from that of the chair ; something that will secure fresh air and a freedom from tension and strain should be chosen. An incompatibility between patient and operator often exists, which tends to break down the dentist.

Dr. Morgan said that he had offered a prize of $200 in the Mississippi Valley Association for the best essay on the diseases of dentists and their remedies. Renal diseases, hemorrhoids, and chest diseases are those to which the dentist is most liable. Sitting while operating relieves the strain upon the abdominal muscles. The strain to which we are subjected is long continued, and that kind of a strain will break a man down sooner than a more severe one of short duration. This does not occur in other operations. We pay too little attention to ventilation and sunlight in our offices. He had found by experience that he could not endure the confinement of practice while he lived in the city; after trying it he had been obliged to resume a more active mode of life and get relaxation by riding, etc.

Dr. Barrett said that there are some patients whom we dread to see, because they are of the class with whom we can establish no proper nervous relations. We do not understand the mysterious vitality which exists, which makes it possible to labor for some patients all day and not become exhausted, while for others we cannot operate without sapping our life-force. We must discover what is the cause of this, or else continue to be robbed of vital force.

Dr. Taft said that for such patients he refused to operate. We can't bring them into a state of compatibility, but they would not be incompatible to other operators. A night of sleeplessness has its cause, which should be removed, and usually could be.

Dr. McQuillen said that there was often more incompatibility on the part of the dentist than of the patient. The proper way is for the operator to conquer himself and so conquer his patients, as Rarey conquered the horse. We should control our patients and make such an impression upon them that they will feel that there is a magnetic power present that they must submit to. It is by reaching the heart that we must control the incompatibles.

If anæsthetics are only privity of oxygen, how is it that they act so promptly? Nitrous oxyd and chloroform act almost instantaneously, while divers can remain under water for some minutes.

We do not exhale all the air from the lungs; at every expiration some remains, which is called the residual air, and the presence of this in the lungs, is the foundation of the hydrostatic test for infanticide. Cutting off the supply of oxygen may assist in producing anæsthesia, but there is in addition a direct action upon the nervous mass. Formerly, in the discharge of various duties, he had been obliged to be up late at night and early in the morning, and to enable him to do it,

he had used coffee and tea, and wrapped his head in wet towels to drive off the tendency to sleep. After a time sleep which had thus been driven away could not be obtained ; no effort would bring it back. When it did come, the scenes of the day were exaggerated and repeated in dreams. To counteract the engorged condition of the vessels of the brain which is present in sleeplessness, exercise and a proper distribution of the blood must be relied on ; walking, riding, swimming, &c., must be resorted to. Food proper in quality, and not too great in quantity, may be safely eaten before retiring, but if too much pressure is produced upon the nervous system in this manner, nightmare ensues. Bromide of potassium has been recommended highly by Dr. Hammond in cases of insomnia, doses of ten to thirty grains being attended in his hands by decided results. Others, however, do not find it so. A glass of lagerbeer serves a good purpose and has a most soothing influence. (Laughter.)

Dr. Jno. Allen said that he was glad to see the subject discussed, since it is the cause of so many of the profession breaking down at an early age. There is certainly a greater proportion of deaths in insanity in our profession than in others, and there must be a cause for it, which can be ascertained. We can neither alter nor amend nature's laws, and we must therefore conform to them. He admitted that some temporary relief could be gained by using stimulants, but so far as elevation is produced by them, so far will a corresponding depression follow. Moderation in such things cannot be commanded.

Prof. Shepard said that he had not observed a tendency to insanity to so great an extent as the last speaker had described in his paper. He thought the practice of the profession was not so exhausting as had been claimed by the essay and the previous speakers. There are many old men in practice ; they may not do as good work as the younger men ; nor is it possible, with the imperfection of vision and want of suppleness in the back which we find at seventy—but they are well men. There were but few members of the profession thirty years ago, and for that reason there are few old men among us now. The great mass of us are in good health, and the exceptions are those who have violated the laws of health. Overwork will bring its legitimate result. Good health comes from enjoying one's business, and he who does not go to his duties with pleasure in the morning, cannot accomplish the best results with the least drain upon the vital forces. The higher one's motive, the further one can get from pecuniary considerations, and the more one feels that he is doing good, the less fatigue he will experience, and the greater his freedom from declining health.

Dr. Barrett said that, in his opinion, there *was* a greater drain upon the dental practitioner than upon members of other professions. It is not the refractory patients that we most complain of, but those that settle quietly down into the chair and draw continuously upon us, and go away refreshed, while we sink down exhausted, and tumble about on our sleepless couch through the night. Such patients leave us too much exhausted to sleep.

Prof. Flagg is in sympathy with Dr. Barrett. The passage of currents of animal electricity may be diminished by interposing napkins, which, by preventing the skin-to-skin contact which does the mischief, seem to act as non-conductors. He disagreed with Professor Shepard, and had always contended that the combined drain upon mental and muscular energy required in the practice of dentistry, was more severe than in any other calling. The love of the work does more to break down than the antipathy; it is an irresistible incentive to overwork. He protested against the use of bromide of potassium, and considered it a treacherous drug. It soon "played out," and the patient was in a far worse state than before. The old fashioned assafœtida is about as good as anything for both patient and operator; it is safe, and does not exhaust its energy. Our operations must be "sugar-coated." Gentleness must be mingled with firmness. The paper of Dr. Allen is admirable and irrefutable. We do not overtax ourselves, as do business men, in an inordinate strife to make money, but we have to do it in the legitimate practice of our profession. Eight years is the average length of time in which a practicing dentist breaks down.

There is a difference between sleep and anæsthesia. Sleep is recuperative; anæsthesia is another thing. In sleep there is a turgescence of the blood-vessels of the brain, but in anæsthesia there is an anæmic condition. We awake from sleep refreshed, but not so from anæsthesia. It is a dangerous condition. Notwithstanding this, he believed strongly in anæsthesia; it is one of the greatest boons ever granted to suffering humanity, and he rejoiced that *we* had given it to the medical profession. But it may be abused. It is often said that only a little is used; that they "never render a patient totally unconscious;" but in fact, when a patient is only partially under the influence of an anæsthetic, every nerve is fully aroused, and every pain is more severely felt than ever. The nervous mass is, in his opinion, affected by the agent, and the sooner it is done the better. The progress of the anæsthetic is from the sense of smell in regular order down to the *pons varolii*, and when that is reached, the condition is a very critical one, and very near

to death. When patients have been tortured, while in a state of complete helplessness, it is no wonder that headaches, insomnia, and hysterics should follow. He had known the daughters of leading medical men to be in that condition from this cause.

Dr. Atkinson : All that has been said has been in regard to the motion of the blood. These are misnomers. The polarization and depolarization is not affected immediately by the breathing of oxygen. We have no right to say that we know anything of the causes with which we are dealing. We can only see concomitants, and not causes. Sleep is one thing—anæsthesia is another. Sleep is natural—anæsthesia is not. When the oxygen has departed from the system it is dead. Any agent may be food, poison, or remedy, according to the tension of polarity. We must not throw away the remedies, but throw away our want of knowledge of the remedies. We must not be extremists. Temperament is only a polarization of currents. We must be master of the situation, and do good regardless of money. We must control our patients, not always by the Rarey method, for we can't always choke them down.

Prof. Taft explained that when he said he would send away a patient because of incompatibility, he did not mean irritability. Those who do not oppose the operator are often the worst. They are repulsive to us, and we cannot help it. They have the choice of operators, but we cannot always choose our patients. If we have the power we can control an irritable, fussy patient, but if we attempt to control incompatibility we shall be broken down and exhausted in proportion as we succeed.

On motion the subject was passed.

Dr. Taft read two reports from the committee on Histology and Microscopy, of which he was chairman. The first one was written by Dr. W. H. H. Jackson, of Ann Arbor. It alluded to the frequency with which the writer, while making microscopical investigations, had observed atrophy, in connection with hypertrophied cement. The two vital forces which build up and tear down the tissues are constantly changing in intensity, and if either gains the ascendency we have hypertrophy or atrophy. This affords a proof that the osseous system is capable of renewing its tissues, though not as rapidly as the soft parts. Teeth are often changed in structure from soft to hard. The wave-lines and laminations of hypertrophied cement show the periods of activity and cessation, as well as the location and extent of these actions. The essayist had noticed in his investigations that bone corpuscles are the most numerous at the beginning of each stage of activity, and at

the points of most rapid growth. If these corpuscles are necessary to the structure, why are they sometimes absent? They may, on the contrary, be the results of pathological conditions, or masses of periosteal tissue involved in the rapidly developed cement, and the writer is inclined to this opinion. Not enough attention is paid to the minute anatomy of the teeth; more attention to it would save injuries to the pulp in operating, and pain to the patient. In incisors, filaments of the nerve often extend far into the dentine, and we should work with great caution.

Transverse grooves on teeth are of two classes: with either rounded or hollow edges. The first are formed during the development of the teeth, or are a pathological result, while the second class is the result of chemical action of the secretions of the mouth.

Prof. Stricker, who has made some investigations in regard to the pathology of suppuration, has arrived at the conclusion that pus corpuscles are formed by the division of the cells of the diseased tissue.

Dr. Taft then read the second report, written by Dr. Swain, of Chicago. It was principally devoted to the consideration of some investigations conducted by Prof. Chase, of St. Louis, which had been described in the *Missouri Journal*. The committee had examined these specimens for themselves, and found that the appearances presented in the drawings were shown, though not so markedly. The bead-like appearances were well defined, and the specimens numerous, all of them having been taken from persons of less than seventeen years of age, and therefore not completely developed. The theory of Prof. Chase was that the tubuli had been formed by a linear arrangement of the cells, the proximal ends being continuously absorbed, thus forming the tubuli. He claims also, that the nuclei still remain in the calcified cell, retaining an amount of vitality which enables it to renew its action, and that by this means the changes which take place in the dentine occur, such, for instance, as the absorption which takes place under a gold filling and over a pulp. The appearances described by Prof. Chase have been noticed by Mr. Tomes, who has described the linear arrangement of the cells, the absorption of the ends, and the formation by this process of a continuous tube. The only difference between Mr. Tomes and Prof. Chase is in regard to the disposition of the cell-nuclei, and the opinions of Prof. Chase on this point are different from the generally accepted ones.

An interesting case of a dentigerous cyst was mentioned, in which, after the extraction of what was supposed to be the deciduous cuspid

from the mouth of a young lady of twenty-three, there remained something which was supposed to be the root, either of the permanent or deciduous cuspid, but which, on being extracted, proved to be a cyst containing sixteen miniature cuspid teeth. The patient informed the operator that the permanent cuspid on the same side had erupted as a "tusk" and had been extracted some years previously by her physician. These miniature teeth had been subjected to microscopical examination, and found to be perfectly developed teeth as to enamel, dentine, cementum, and pulp cavity. The appearances were shown in a number of photographs which accompanied the report.

The meeting then adjourned.

Evening Session.

The report on Histology and Microscopy was still under discussion.

Prof. McQuillen said that he was glad to know that gentlemen were making microscopical investigations for themselves, instead of relying upon those of others, which in America there is too much disposition to do. The microscope is too much of a toy with us. Nutrition, however, is not capable of being observed by the microscope; we can observe its manifestations and progress only. He had once been honest in the belief that "*omne vivum ex ovo,*" and had taught it for years, but was now becoming skeptical in regard to it, though not prepared to say that it was false. There had been apparent beginnings of life from a formless fluid, and if a germ is not requisite to form a crystal, as is believed by most persons, it may be reasonable to believe that out of a formless fluid life may be evolved *de novo.* We live upon what is denominated dead matter; the somatic and molecular life of our food is destroyed by cooking. Now when does it pass again into living matter? If it is when assimilation takes place, we have practically a case of development of life *de novo.* He regretted our inability to present the results of original investigation, but after having practiced at the chair all day, one is in no condition to devote time to this work at night. Our institutions should be endowed so that young men inclined to devote themselves to these pursuits might be able to do so, and then America could furnish its contribution to science as the Old World does.

Dr. Atkinson said that we ought to be thankful that we know anything on the subject of life, though the best men know but little. We shall never know anything about it till we go to the bottom of function. When the systemic life has left the cadaver there still remains atom-

ic life, and atoms cannot be killed. We have been told that the atomic life of our food is killed, but that statement is either a *lapsus linguæ*, or it shows an utter misapprehension of the subjects. The coalescing of atoms manufactures molecules ; plasma is an aggregation of molecules. There is crystalline life, and there is something below that ; a crystal is regularly arranged granules, and they are regularly arranged cellular life. The idea that there is an existence without life will not do in this day. When the systemic life has left the body, then is molecular life left, and that is the life which we suck from the beefsteak. Ultimate atoms cannot be deprived of life without reducing them to gases or metals. The doctrine that "*omne vivum ex ovo*" is as old as Harvard. If the proto-plasmic mass is an egg, then the doctrine is true ; you can't have bread without dough. All the investigations of Bastie do not prove that the germs are not eggs ; they only prove that these small points have not been detected before. An atom is only the two hundred millionth of an inch in size, and that is something hardly possible to conceive of. If one side of it is hot and the other cold, that is polarization and depolarization, and that is the point where freezing begins, which is crystallization. The laying together of molecules forms the crystal, and that is the alphabet of the changes that take place in all chemical elements.

The subject was then passed.

ABSOLUTE ALCOHOL.

By James Stocken.

The use of drying agents for the cavities of teeth having been recently brought under the notice of the profession, and absolute alcohol generally admitted to be the best agent, I beg to suggest to the members of the profession a ready mode of procuring it, namely, the addition of carbonate of potash to the ordinary rectified spirits of wine, in the proportion of one of the former to four of the latter. Owing to the great affinity carbonate of potash has for water, it will abstract the water from the spirit, not entirely, but sufficiently for all practical purposes. This is a plan I have adopted, and is within the reach of all, whereas to procure it in the ordinary way by distillation with quick lime, is not.

33 Euston Road, London.

DISCUSSIONS OF THE AMERICAN DENTAL SOCIETY OF EUROPE,

In Hamburg near Frankfort, August 2nd to 5th, 1875.

Reported by C. M. Wright, D. D. S.

ON THE TREATMENT OF DECIDUOUS TEETH.

Dr. Field (London), considers the treatment and preservation of the deciduous teeth among the most important duties of the dentist. These teeth should be preserved till Nature's law has been fulfilled, and the proper time shall have arrived for their removal. Considers this care and this preservation necessary, to prevent contraction or at least the want of proper expansion of the jaws of the child, and to prevent irregularites of the permanent set. The child should become a patient at the age of two or three years—so that if the teeth do not present a good quality of bone or enamel, systemic treatment may be begun. When caries has developed in these teeth, prepares the cavities and stops them with amalgam or tin, and does all he can to conserve the teeth till the proper time.

Dr. Eastlacke (Berlin), has pursued the Harris method of cutting away with a file, leaving a shoulder at the neck—that is, where caries has attacked the proximal surfaces of these teeth. Fills the cavities in the crowns. Upon the question being raised about the objections to cutting away between these teeth on account of the contraction of the jaws, answered, that he does not cut away sufficiently for this, even if it were possible that contraction would occur from the operation of separating these teeth. Cuts away to remove caries and conserve these teeth. Demonstrated on a plaster cast the method of making the separations.

Dr. Jenkins (Dresden): Only at the time when the six-year molar appears is there any pressure upon these teeth, tending toward the narrowing of the arch, or the closing of spaces made between the deciduous teeth; but at this time there is pressure—and if the second deciduous molars have been removed before this period, the six-year molars will be found nearer the front of the mouth, by an appreciable distance, and consequently there remains less room for the permanent teeth. The separation of the deciduous teeth, then, before the eruption of the six-year molars, should be avoided.

Dr. Brazier (Stockholm): The difficulty with these teeth is, first, in

educating your patients—the parents and children—so that the dentist can begin early enough to accomplish much good. When not too late, treats these teeth as he would the permanent. Fills with amalgam or any other material, and tries to impress the necessity of cleanliness and frequent examination. This habit on the part of children and parents is half the battle, and too little care is generally given by dentists in impressing this fact upon the mind of their patients. Would not take the trouble, nor cause the pain to children, to separate and file for the prevention of caries in these deciduous teeth. Does not operate till disease makes it necessary. Allows even dead deciduous teeth to remain, as long as they do not cause pain and serious trouble.

Dr. Eastlacke (Berlin), wished the discussion to cover the *best means* of conserving the deciduous teeth.

Dr. Norman Kingsley (New York), being called upon, replied—I agree with my friend Dr. Atkinson, of New York, that no matter how simple a subject may be, no matter how much we have heard of it, no matter how old it is, nor how much we may think we know about it, we could still discuss it, and with profit, for hours, days and months, and not exhaust it. The subject before us is one of these simple subjects, one of these well-known, often-discussed questions. I should like to ask the members of this society to answer, Why do you preserve the deciduous teeth? You say you do conserve them, but *why? Why*, from your own observation and experience. Do we say simply we conserve these teeth because we have been in the habit of saying so, or because it is a popular notion that the jaws will contract, or not properly expand, if we do not preserve these teeth, or do we know it from our own observation? No man can speak positively excepting from his own knowledge and observation. Is it a fact, that it is essential that the temporary teeth should remain? Is it a fact, that for the good of the position of the permanent teeth, the temporary teeth should remain? Is it a fact, that the premature extraction of these deciduous teeth affects the development of the second set? From my own observation, not from yours, I think you might extract one or all of the temporary teeth at an early period of the child's age, without a *certainty* of producing any irregularity. There *might* be one *possible* irregularity. If all the deciduous teeth were removed long anterior to the eruption of the permanent, the bicuspids and cuspids *might* be in contact, and the cuspids might appear prominent and out of line. They might, I say. This *might* occur, but it is not at all *certain* that it would. It is possible that a perfectly regular set of permanent teeth may appear after the premature extraction of

the temporary teeth. Other close observers have arrived at the same conclusions. In regard to operations on the temporary teeth, the dentist should be governed entirely by his own judgment. On general principles would say that it would be better to extract dead and troublesome deciduous teeth. Would say, stop decay when it begins, and save these teeth from disease till Nature's time for their removal. Stop decay by filling, or if the case calls for it, by cutting away. As for materials, regards gold as the very *worst* of all materials for children's teeth, on account of the age, and on account of the impressions on the child's mind made by difficult or tedious operations. The great thing to be avoided is to allow the impression of "the horrid dentist" to enter the child's mind, so that in after years he will only apply to us as the *last resort—as the last resort.* Therefore, would use anything that would make these operations easy and *stop decay.* It is a question sometimes, whether cutting out the decay where it would be likely to continue would be advisable. In superficial decay would unhesitatingly say cut it away. There are no rules; we must use our judgments, having correct principles upon which to base them.

Dr. Jenkins (Dresden), insisted that if the deciduous teeth are extracted before the eruption of the six-year molars—these molars do drop forward and are not in the position, the proper position that they would have held had the temporary teeth remained. The result of this dropping forward of the teeth can easily be seen; the arch is affected, the incisors, cuspids and bicuspids are crowded or irregular, and these are the teeth we are called upon to regulate and to bring into position. In the filling of temporary teeth, does not excavate thoroughly where there is danger of exposing the pulps. These teeth are less sensitive than the permanent, and the danger of exposure is much greater. Prefers then, with this consideration, to leave layers of decomposed dentine in the cavities rather than expose the pulps.

Dr. Eastlacke (Berlin) wished to be understood in his remarks. Does not cut away and file and fill temporary teeth, from the fear of spoiling the arch if these operations are neglected, but to stop the decay, to prevent pain, and to keep these teeth as masticators till the proper time for their removal.

Dr. Charles Kingsley (Paris): With a pulpless deciduous tooth would do exactly as he would with a permanent, except that he would not fill the roots with gold. In all cases where he would operate, would excavate thoroughly, even at the risk of exposing a pulp; for even if a tooth or cavity is hermetically sealed the decay does not stop; its pro-

gress may be slower, but not entirely arrested. Thinks the cartilaginous dentine saturated with creasote, in some cases, just the worst possible covering for the pulp. Would therefore, in many cases prefer to remove it and expose the pulp.

Dr. Sylvester (Berlin) has had for two or three years the opportunity of examining many cases from the hands of Dr. Abbot, where the cavities were not thoroughly excavated, but where they were thoroughly filled, and has found the method a very successful one. Would like to hear from the President (Dr. Abbot) on this question.

Dr. Abbot (Berlin), stated that in these cases he would not run the risk of exposing the pulp, but would leave a layer of decomposed dentine and fill over this.

Dr. Jenkins thinks that this variety of opinion may arise from observations from totally different localities.

Dr. Terry (Zurich) agrees with Dr. Kingsley in the treatment of necrosed deciduous teeth—for many years followed the old practice of verting the roots of necrosed deciduous teeth, but now treats the teeth as he does permanent, and is much better satisfied with the results. Believes in conserving the temporary teeth as long as possible—operates carefully for children, but tries to accustom them to dental operations—preserves these teeth for masticating benefits or uses, and also for the benefit of the permanent teeth—for a lot of decayed and decaying temporary teeth affect the permanent teeth. For after the six year molars have erupted, and after the incisors, there remain often decaying temporary molars and cuspids that are very offensive and injurious. In filling the roots of deciduous teeth, cuts down from the crown as in permanent teeth, and makes the operation as perfect as possible. Has found that the temporary teeth yield more readily to treatment than the permanent.

Dr. Field (London) asked what would be the condition of the permanent teeth in the mouth of an abnormally developed child, if the temporary teeth were prematurely extracted? From his experience or observation, and he has had opportunities of observation in Geneva, where it is a practice to extract too early the temporary teeth, he finds irregularities in abundance; and in the same family, where, with another child he has conserved these temporary teeth till the proper time for their removal, a marked improvement in the positions of the permanent set had followed. This has occurred in a large (comparatively speaking) number of cases. Perhaps in perfectly normal conditions the theory of Dr. Kingsley can be proved, but we do not have these cases so often. Would say that the premature extraction does, in these cases of

abnormality, result in irregularities of second teeth, else why the improvement perceptible from the different treatment, in children apparently no better organized, and in the same families where the same hereditary influences exist.

Dr. Norman Kingsley (New York): For months—I was about to say years—before the eruption of the biscuspid, the fully developed crowns of these teeth are in their positions, and you cannot force or bring about any irregularity without violence. If you think you can produce irregularities by the extraction of teeth, you are mistaken. Excuse me for speaking dogmatically, but these opinions, this positiveness, is the result of long and patient research in this matter.

About the tipping forward of the six-year molars, thinks it barely possible that this might occur if the second temporary molars were extracted at the age of three or four.

In regard to children of the same family showing different degrees of regularity in the permanent teeth, this occurs too often without treatment to prove anything positive.

Dr. Lynn described a case of a child five or six years of age, where the second molar was extracted, and a beautiful milk-white cusp of the second biscuspid was seen just protruding above the margin of the gum.

Dr. Kingsley (New York) described a case of abnormally (in time) developed biscuspid in a child between four and five years of age, where a New York surgeon was about to operate for tumor—it appeared over the second molar, and he upon being called in advised waiting. The result was a biscupid tooth instead of a tumor.

THE NEW JERSEY STATE DENTAL SOCIETY.

The New Jersey State Dental Society held its Fifth Annual Meeting at Long Branch, commencing July 6th, and continuing the 7th and 8th, President Brown, of Mount Holly, presiding. The first day's proceedings were taken up with the election of the following new members: Drs. L. S. Marsh, H. E. Parke, D. H. Thickstun, Wm. E. Francis, Charles W. Meloney, W. W. Dorland, and C. M. Merritt. The Board of Examiners reported that, during the year past, they examined and gave certificates to practice to the following: Drs. Wm. E. Francis, F. J. Leonard, A. L. Strecher, and R. J. Reed, after payment of fee.

The session of Wednesday opened with the President's address, from which we make the following extracts. Giving an interesting resumé of the year, he spoke of amalgam as having renewed attention given to its use by careful tests and experiments. That amalgam properly prepared and used will preserve a tooth for years, is beyond a doubt; improperly used, it is worse than useless. Celluloid has taken great strides the past year in public favor, and is fast superseding the use of rubber. Beautiful in color, strong in texture, easy of manipulation, it bids fair to take the place of all other materials as a base for artificial teeth. It appears to be just what we wanted to release us from the obnoxious rubber company. I think every dentist who has learned to use it will never go back to rubber. Our law regulating the practice of dentistry is working well. Though being much more stringent than the New York law, yet no fault has been found in its workings. He urged upon the society the adoption of a rule prohibiting any member of the society from receiving a student for a less period than three years, and making it obligatory upon the student to attend two courses of lectures, and graduate at some dental college. He would advise the passage of a resolution that after a period of three years, no one should be received as a member who has not complied with the same. The address was well received, and elicited considerable discussion, nearly all coinciding.

The first essay, by Dr. T. B. Welch, of Vineland, was then read, and well received.

Some hurry through their dental operations from selfish motives. They are in haste to be rich, and therefore anxious to make every hour of labor count the greatest number of dollars income. Nearly all such come to grief, as they should. Some who are naturally nervous and excitable, are not aware of a want of care—it being a misfortune, and the sooner they overcome this weakness, the better workmen they will be. Others hurry from pride to be smart—continually boasting of how many teeth they can fill in an hour, or how many teeth they can extract in a minute. This is foolish. We should work as rapidly as we can consistently with accuracy. The greatest pride of the true workman is in the perfection of his work, and he is generally modest in his claim. Let our reputation speak of honor, dignity and success. The essay was well discussed, coinciding with the views of most.

Dr. C. S. Stockton, of Newark, followed with an essay on Dental Education, of which the following is a synopsis:

The first point was the extreme haste of the profession in manufac-

turing dentists of their students. The early and thorough education of one who proposes to enter the profession of dentistry, is of the greatest importance. The eagerness of the American people to enter business life, and the haste to get rich, are the glory and vice of America. The uneducated man and dentist goes out into the world, and is alone. Letters, philosophy and the sciences have no interest to him, and their delights to him will forever remain closed. He claims that he is not appreciated at his true worth. It is his own fault; for if he enter the circle of the educated, he must be educated himself to their standard. There are so many men not blessed with the best qualifications, and the number has been so increased, that the time has come that societies like this should make their voices heard. I would have no one commence the practice of dentistry at this day unless he be a graduate of the Dental College. I would have no one enter a dental college unless he has spent two years in the office of a competent practitioner. Colleges are blamed in a manner for the way they make dentists. In a measure they are unjustly censured. The college has done more for the profession than all other means combined. Young men are taken by some of our practitioners, sent at once to college, without any previous instruction, and the college, in eight months, is expected to make thorough dentists of them. Let us cherish our State Society, as I know of no better way of promoting dental education in New Jersey than by faithful attendance of its sessions. What possible ambition to high deeds can a man have who lives wholly within himself. Let us then, as our means to higher professional attainments, cherish this association, educate each other and the dentists of New Jersey.

Dr. Welch agreed with Dr. Stockton.

Dr. Hayhurst considered that all general laws bore hard in certain cases; but better it be so than to open the flood-gates to incompetency.

Dr. Kingsley thinks the pupil should study three years, and pass through college, as the paper recommends.

Dr. J. R. Goble differed entirely, and thought that it should not be obligatory upon students to attend dental colleges, and spoke of the incompetency of graduates for every-day practical work upon leaving college, they wishing to perform all operations in the manner and way they did in the college. He denounced the system of selling diplomas, having proof of a certain college granting a diploma which the New York Board of Censors refused to grant, because the candidate was wholly incompetent. The diploma of the college could not, in his estimation, guarantee a fitness to practice.

Dr. Hanks defended the college system, but condemned its abuse, and thought the present system of medical and dental colleges wrong.

Dr. Hayhurst, ex-College Professor, cited the thoroughness of the examinations, and did not consider the Board of Censors had as good an opportunity and the time at command as a college faculty.

Dr. C. A. Meeker recommends that the examinations of the Board of Censors be so thorough, that the diploma of the Society will be an honor to hold, though the candidate holds a degree of D. D. S. Also, as Dr. Stockton says, to work for the elevation, education, and character of the Society.

After considerable discussion by a number of others, the subject was closed.

Dr. Geo. D. H. Perine, of New York, by special request, spoke at some length upon the use of the Galvano-Cautery Battery for oral surgery. Dr. Perine said that there was advance in all departments of science, particularly so in our own department, dental surgery; he claims that the introduction of the cautery (he being the first person who has applied that particular cautery in oral surgery), *is the advance of the age*, and he strongly recommends its use. If the cautery be employed for obtunding sensitive dentine, he would advise its application to be made with great care, and only in cases where the instrument can be applied directly to the tooth to be operated upon, guarding the instrument from contact with any other tooth, the action will be instantaneous and effectual. Doctor Perine illustrated the use of the battery for operations in oral surgery, and presented the instruments he uses. The advantages he set forth are, that the operation is instantaneous, painless, and without shock to the body, which it does not in any degree affect unpleasantly; the application is easy, free from hemorrhage (which is of great moment in surgical operations in the mouth), and, finally, the reparative process is rapid. Doctor Perine freely gives his thoughts and experiences to his professional brethren, and strongly recommends the use of the battery for oral surgery. Next followed

Dr. J. R. Goble, of Hoboken, who read a highly interesting paper on the cause and cure of the absorption of the alveolar process, taking the ground that local irritation was the primary cause, proceeded by salivary calcus, diseased teeth, etc., the cure of which was to remove the irritation with delicate instruments, keeping the necks free and well polished, and recommending the use of a weak solution of chlorate of potash. He deprecated the custom of so much scrubbing the teeth, citing numerous instances of absorption and denuding of the enamel.

Prof. Abbott, of New York, said he was well pleased with Dr. Goble's remarks, and agreed with the doctor in every particular, and hoped all dentists would instruct their patients in the use of the tooth-brush. He also, by special request, spoke of the use of salicylic acid, for use in diseases of the mouth, it having strong antiseptic properties, and being perfectly harmless.

Dr. Kingsley and others recommended the use of aconite and iodine saturated solution for inflammation, and for use after filling new cavities.

Subject passed.

On motion of Dr. C. L. Stockton, the President was authorized to welcome to New Jersey, the American Dental Convention, which meets at Long Branch in August. Adjourned.

SESSION OF JULY 8TH.

The invention of Dr. Chevaliers, in regard to an improvement in metallic bases, was delegated to a committee of Drs. Stockton, Pinny and Meeker, to report at next meeting.

The *Dental Luminary*, a small pamphlet designed for distribution by dentists among their patients, which would enable the reader to discriminate a good from an inferior dentist. The committee spoke very highly of it, and it was ordered printed by the society, provided enough copies from individual members would be ordered to make it practicable.

Atlantic City was decided upon as the next place of meeting.

Drs. Welch, Goble, Hayhurst and Stockton were elected delegates to the New York State Dental Society.

Dr. J. W. Hayhurst next spoke on the best method of inserting partial plates of teeth. In taking the impression, plaster was considered the best article. The contact by the plate on the natural teeth was not by him considered necessary; the atmospheric pressure being sufficient; when the impression was perfect, everything depended in making a perfect fit on that.

Dr. Dibble thought an air-chamber not necessary; made all his plates without their use.

Dr. F. W. Barlow gave his method of using wax and plaster in difficult under-cuts.

Dr. Meeker asked essayist the best place to put the air-chamber? The doctor thought, in a high roof, the end of the plate, and in a flat roof, near the centre; deprecated the custom of having so many angles to them.

Dr. Stockton considered gold the best for partial and continuous gum for full sets. Subject closed.

Dr. F. F. Hanks, of Jersey City, then read the following essay on Amalgam :

After Dr. Bogue's able and exceedingly thorough exposition of amalgams under every condition that we may be called upon to use them, it seems to me presumption to say anything on the subject unless one can say something new. But I have the consolation that I am not alone in this, for so long as dental societies exist, just so long will we be called upon to give a re-hash of what has been said and done before.

When I took the subject, I intended to go much more fully into this matter than I have, until I saw Dr. Bogue's article, which covered the ground so completely and much more scientifically than I ever hoped to do, that I have contented myself with making only a few experiments.

I would suggest before all things that we be candid in what we say in the discussion that may follow, and say exactly what we mean and not exactly what we do not mean on this important subject. Time and time again have leading men in the profession denounced before dental societies the use of amalgam in any manner or under any circumstances, returning home to use it privately in their daily practice. Amalgam has simply been unfashionable, and the young men with reputations to make have been warned that they could not afford to speak favorably of it. Now all that is changed. Amalgam has become the rage. The journals as well as the teeth are filled with it, and voluminous papers are read before learned societies about it. While amalgam was under the ban tons of it were made, but no one used it. The manufacturers said they sold it to the dental depots; the depots said the dentists bought it; but the dentists said that they never used it. [Laughter.] If this was true, what a tremendous stock some of us must have, now that amalgam has grown to be so popular! But now that Fletcher, Bogue, Hitchcock, Cutler and others have taken up the subject and proved that amalgam is not the bugbear we have been taught to believe it was, I fear that foolish and unskillful men will now push the use of it to extremes, as they have rubber, heavy foil, and a great many other things that are very useful in their proper places.

Amalgam is no better nor no worse to-day than it has been for years (with perhaps a few exceptions), and in my opinion it should retain the same place it has always held in the hands of good operators—that is, as a cheap substitute for gold in posterior fillings, as rubber and cellu-

loid are cheap substitutes for gold and platinum for artificial plates, only to be used when the patient is too poor or too mean to pay for the better article.

I would also suggest amalgam for badly decayed teeth where the expense would be great and the success of the operation doubtful.

The object of most writers has been, I think, to test by actual experiment the theories and assertions advanced from time to time on this subject, and to find out the exact scientific basis that amalgam has to rest its claims upon as a useful agent in our daily practice, and not to make converts to the use of amalgam, as some unreasonably think.

The following is a specimen of the groundless assertions that have been recklessly made from time to time :

Dr. Payne in the Chicago *Medical Journal* speaks of the poisoning of thousands of people all over the world from corrosive sublimate generated in the mouth from amalgam fillings.

This assertion is pretty effectually answered by the certificate of analysis of Prof. Chandler of Columbia College, addressed to Dr. Bogue :

"Sir.—The samples of saliva in which various alloys (amalgam) had been digested, submitted to me for examination, contain no mercury in solution."

These samples of amalgam, with the teeth in which they were placed before being submitted to Prof. Chandler had been immersed for three months in various acids so powerful as to nearly dissolve the teeth.

There are three samples of each of the following amalgams before you : Arrington's, Townsend's, Lawrence's "Extra," Fletcher's and Kearney's. I do not see any great difference in the working of these amalgams, with the exception of extra amalgam, which works poorly.

In conclusion I would say that if almost any amalgam is used with care teeth can be filled to preserve them without injury to the health ; but as for putting it on a par with gold, I certainly do not, except in the few cases already mentioned.

Dr. Hanks' paper was well received, and gave rise to considerable discussion.

Dr. L. H. Delange then read a paper, Rubber *versus* Celluloid, for which he received the thanks of the society.

Bad are the goods when two masters chase one man. Good for the man. Two men have two workmen. Good for the consumer. So it is with rubber and celluloid.

Before 1870 we used but one material, we employed but one work-

man; since we have had other toilers, and, ergo, other substances; for, if "necessity is the mother of invention," competition is certainly its father.

It is due to the earnest efforts of the Messrs. Hyatt, that celluloid has reached even its present state; as the compound we have now, has certainly more plasticity and less inflammability than the collodion obtained by the process first patented.

In experimenting with camphor and soluble cotton, they were mixed and casually squeezed in the hand—when it was found that they compacted and showed signs of combination. It was previously known that a solution of camphor and alcohol was a solvent of the soluble—cotton, but this proved that alcohol need not be used: and that camphor was, under proper conditions, a perfect solvent.

It was then ascertained that a chemical combination took place; and a short time after the first experiment, by heating the material to a lower temperature than was necessary to melt camphor, a lump of solid celluloid was produced; subsequent experiments have developed the fact that a smaller quantity of camphor could be used, thereby making better plates, and almost doing away with the unpleasant recollections of last winter's clothing.

One of the greatest objections against celluloid, formerly urged by the vulcanists, was, as we have said before, the unpleasant camphor taste, and we believe this is still put forward by some of the non-experimenters. This difficulty has been well nigh, if not entirely, overcome within the last year or two.

In working this substance no disagreeable odor is noticed, as there doubtless is in rubber: in fact, this is quite a point against rubber, for in manufacturing it sulphur is used, and we all know what a delightful perfume results from the combined effects of escaping sulphurous gas and heated caoutchouc. Not only is the escaping gas offensive, but it is unhealthy; a fact which could never have been stated of celluloid, even when in its condition of greatest imperfection; the odor of camphor, though not pleasant to all, is beyond denial unhealthy to none, and even this is passing from us. The rubber retains its obnoxious scent even after completion.

That the new compound is more agreeable to the mouth, is easily judged from the remarks of the patients, and the general satisfaction that it gives.

It is much lighter than rubber, and decidedly more susceptible to a high polish when we have the set completed; and together with these

pleasant properties, it also refrains from heating the mouth as the old material does.

The whole substance has now properties of lightness, toughness and strength, together with a resisting power which vulcanized goods never had, or never will possess.

Celluloid now is entirely different from that which was first manufactured. Dentists who made use of it at that time had obstacles which they thought they would never surmount. These failures induced a number of the experimenters to toss their celluloid and apparatus to the waste pile, and return to their first love—Uncle Josie.

We quote from the "Cosmos" of March, 1872, the remarks of Dr. Earnes, as follows:

"Sufficient time has now elapsed to prove, we think, the utter worthlessness of this material as a base for artificial teeth, and we publish the following list of experimental cases with this base, with the results, as our own experience, and upon which, in part, we have our opinion of its merits."

After which follows a long and most melancholy list of failures, both in color and texture. His plates ran from pink to dark brown, and then warped and shrunk to such a degree, that sometimes the plate would not touch the centre of the arch by one-fourth of one inch. It appeared that all of his cases were returned in about three weeks, or less. Unfortunate man!

Do dentists ever think of the failures made and the trouble caused by rubber on its first introduction? I do, for at that time I acted as an agent for the Goodyear Rubber Company, and had more, much more difficulties in introducing it, than the agents for the celluloid have had in bringing their base before the public.

Dentists howled at the idea of using rubber in the mouth; they said it was unclean, that it smelled badly, and I well remember several prominent members of the profession, among whom was Dr. Elisha Townsend, of Philadelphia (now deceased), stating that he would not have anything to do with a material injurious to the mouth.

The feeling was so cogent that some dentists advertised that the new base would not be used in their establishments, but they did use it eventually, as it was the only means of self-protection, and with the exception of the metals, it held undisputed sway for a period of more than fifteen years.

But now another base has interfered with the even tenor of its ways, and in celluloid it will meet its Brutus.

Does it not argue strongly for the excellence of the new material, or the perniciousness of the old, that this composition should, in less than five years, stand the mighty rival of rubber, with its twenty years of experience, and "millions in it."

One of the great points the old dentists had against rubber was its injuriousness, not only to the mouth, but to the whole system; and the cause for this we detect in a moment, when we hear that the coloring matter used is the red oxide of mercury, to the amount of over one-sixth of the whole.

Of course, in vulcanizing, minute globules of mercury are set free, and what is the result? Salivation.

Dr. J. C. C. Dowing tells us of a patient who consulted him in May, 1874, who had been suffering for over six months from dizziness, bad memory, want of sleep, depression of spirits, "dimness of vision, protophobia, increased lachrymation, nasal secretions alternating in excess, or deficiency; mucus lining of the mouth, throat, tongue, gums, &c.; congested and irregularly covered with various sized patches of superficial ulceration, painful deglutition, increased salivary secretions; fetor of breath, skin of the arms, neck, chest, and, to a greater or less extent, the rest of the body, covered with an eruption in various stages of progress, attended with a sense of heat, dryness and itching; pains in the bones, which were worse at night, together with the loss of the appetite."

He examined her artificial teeth, and having ascertained from her that she had worn them for sixteen years, he saw the cause of all her sufferings in an instant. The polish was worn off the plate, and under a small lens, the surface seemed studded with minute excavations, like needle-pricks. Where was the mercury? In her system. To use the words of Brett Harte, she was "salivated with mercury."

He also gives another case, but this is enough, as you have, no doubt, all seen similar circumstances, and have known what caused them; dare we say how many cases have occurred in which the cause was not suspected? Now celluloid is covered with the same material, but in the infinitesimal proportion of one-sixteenth of one per cent. and often less, with this amount, people could not be "poisoned" unless indeed they lunched off the material, on the principle of "Jerry Cruncher."

Can we compare the color of rubber with that of celluloid? the former is no more like the human gum than an article often mentioned—to be found in the hats of some of the candidates for office, a brick; the

latter is such an exact representation, that even professionals can often be deceived. Of course, the red oxide of mercury can be done away with in the rubber, leaving it a beautiful black, and may be successfully introduced into China, in the course of time, for their married ladies; elsewhere I despair of its success.

On account of the resemblance of celluloid to the gum being so perfect, the plain teeth can be used, and you know full well what an advantage that is. The cost is so much less; for even if the price of the celluloid plates is higher than an equal amount of rubber, yet the immense saving on the plain teeth more than compensates for the extra expenditure.

In doing away with the gum teeth we get rid of the proclamation of falsity contained in the unsightly separation of the blocks. Then the cleanliness with which this can be manipulated must give general satisfaction, together with the little work required in finishing. It is susceptible of the highest polish, and retains such a coralite lustre, that it is now used by jewelers as an imitation of that substance. Another great advantage is the impossibility of detecting a repair, which is always seen in rubber, by the difference in color.

There has been a variety of machines invented for the practical working of the new compound. The boiler with oil was first used. The difficulty in procuring pure oil induced the substitution of steam.

We are indebted to the enterprise of Dr. Hunt, of Washington, D. C., for the introduction of glycerine, quite an improvement in oil.

No doubt that many of the failures of our dentists may be attributed, not to their ignorance in working the material, but to the poorness of the machines that are now in use. Of course the apparatus manufactured for the vulcanizing of rubber has been brought to a high state of perfection, through long years of experiments, as well as experience, but give the celluloid the same opportunities and rubber would be but a dim vision of the past.

In making celluloid it is of the utmost importance to pay particular attention to the thermal changes, as when heated above 280 degrees Fahrenheit, the mass becomes spongy, and when not heated up to this point, it has not the required plasticity; therefore the pressure should be applied gently at first, and increased as it approaches the finishing point.

The greatest development in the laboratorical working of this substance has been made by Dr. Hindsman, of New York city, whose machines take a decided lead of all I have seen, not only for the certainty

of working up your cases, but for the facility with which you can examine your work during its progress.

Before I close my remarks, I must call your attention to the fact, knowing it, as many of you do, that I am a non-licensee of the Rubber Company, and you may suppose from that I am like the "fox and the grapes." Let me assure you such is not the case, and were I proffered a license free to give up the use of celluloid, I would refuse.

To recapitulate, the advantages of celluloid are as follows:

First. It has a toughness which rubber does not possess.

Secondly. It is cleaner.

Thirdly. It is stronger.

Fourthly. It is a better color.

Fifthly. Plain teeth can be used.

Sixthly. It is more pleasant to the mouth.

Seventhly. It is lighter.

Eighthly. It is devoid of unpleasant odor in working.

Ninthly. It is not poisonous.

And last, though not least, we save "our bacon."

Dr. Stockton made drawing of a dry heat apparatus, which he considered the best method he had used so far.

Mr. Starr, representing Mr. S. S. White, gave his experience in the use of celluloid, which was very interesting to the members present.

The subject was then closed, and the newly-elected officers installed.

Dr. C. Stockton, President; J. W. Scarborough, Vice-President; Chas. A. Meeker, Secretary; J. W. Dibble, Treasurer.

The retiring officers were awarded a vote of thanks, and thanks extended to the representatives of the press and the Messrs. Leland.

Chas. A. Meeker,
Secretary.

DENTAL SPECIMENS FOR THE MICROSCOPE.

By Henry S. Chase.

To students and progressive young practitioners:

Everything is comparatively easy to do after you *know how*, and have done it a great many times. I am often asked, "How do you make your specimens?" When I answer, the inquirer says, "That seems to be a great deal of work!" Oh yes, it is a great deal of work, but if you love the work, the work loves you, and makes itself as agreeable and light as possible.

So far as the operations of making a specimen are concerned, they are very simple. Let us see : here is a bicuspid tooth, extracted in regulating, and it is not decayed. Now, I will take a watch-spring saw, or a thin file, and cut it up into thin cross sections. I hold the crown in a small pair of straight forceps, and, commencing at the apex of the root, saw off a piece two mil., or the thirteenth of an inch in length. This is laid down by itself, and another section made and laid by the side of the former, a third one is cut and laid by the side of the latter, thus proceeding until the whole root is cut up as far as the enamel, the relative position of each part preserved in the row of pieces corresponding to its place in the whole root. The object of this is that each part can be accurately described after being made, and thus we can always be able to tell the exact portion of the root from which any particular section came. This is of great importance if you wish to accurately study the histology of the teeth. The enamel being too hard to cut with the saw, we can only cut the crown up with a thin file. Don't be discouraged if you break three or four files in cutting up the crown. We have cut up the crown now, and so have about fourteen sections altogether. These are to be rubbed down as thin as tissue paper. We must have three stones to do this. Purchase at the hardware store a very coarse scythe stone, a sand stone six or eight inches long and an inch thick. Call this No. 1. The next stone may be a scythe stone of finer grit. This is No. 2. A third stone, nearly, but not quite as fine as the "Arkansas stone," which all dentists use, is No. 3. These are all to be used with water. You want a large bowl of water on your left, with a small sponge in it. This is to often moisten the stone that you are using, and with which to wipe off the debris. We must cut up an old kid glove, not too dirty—I beg mine of the ladies—pull a glove finger on to the forefinger of your right hand, and press the end of it on the first specimen so that it will imbed itself somewhat in the flesh ; place it on No. 1 stone, which is wet, and rub it back and forth until it is one-half thickness ; now remove it to stone No. 2, and do the same, but turn it over once or twice on the latter stone, so as to preserve an *even* surface ; keep your glove finger as *dry* as possible, and the "section" will stay in place, but if you get the kid quite wet it will certainly be slipping from place, which will annoy you, and it may even be lost. As the section grows thin the color of the glove begins to show through it. Now put it on No. 3, and polish it down on both sides in the same way, and get it just as thin as it can be made without its being worn out. The latter will happen once in a while, and you

will think it is lost. The stones should often be wiped off with the clean, moist sponge, for in addition to the debris coming from the section, still more comes from the glove, which latter wears rapidly out, making it necessary for you to put the section on a fresh portion of kid. In my first experiences I often wore the skin off my finger until it bled, without being aware of the fact, the water and the pressure removing its sensibility. When a section is thin enough place it on a clean plate, and put a goblet over it, or a bell glass, or another plate. The same relative position of each piece should be maintained, and so until each specimen is labeled. When all are ready, or before if you wish, the process of "mounting" commences. We must have plenty of plate glass slides, pieces of glass one inch wide and three inches long, also some round or square covers of thin glass, about one one-hundredth of an inch thick. With *thick* glass we can only use "low powers," and so our specimen would be of little value. Both glasses must be perfectly clean. Lay a slide that you are to use across an open paper box, so that its surface shall not be touched. The cover may be laid across the corner of a box so that its surface shall be free. Take a slide in the left hand, and place with a wet pen-knife blade a section on the slide; now put a few drops of alcohol on the section and slide, and move it about with the knife-blade for the purpose of washing off any dust that may be on the section; when this is done, take up the section and place it on the other side of the slide, and immediately cover it with the covering glass, placing the down side of the latter next to the specimen. The object of using the *down* sides of the glasses next to the section is to avoid dust as much as possible. The slide may now be carefully laid across a box or some object from which it can be carefully lifted. We wish the alcohol between the glasses and in the *substance* of the section to dry out. When dry, the *cover* and section will slip off, and the latter be lost, if care is not used in handling.

The slide may now be held over a small spirit lamp to warm the glass and make the balsam, with which it is to be mounted, flow readily. An open mouth, two-ounce bottle of balsam fir is wanted. A worn-out plugger may now be dipped into the balsam so as to have two or three drops adhere to it; place a drop by the edge of the cover, and if the slide is warm it will run under the cover, and through the specimen, more or less expelling the air and making the section look *clearer* than before. The balsam should occupy the whole area of the cover. It will often be necessary to put a drop at the opposite edge

of the cover to accomplish this readily. If you wish to get a *very clear* specimen, the slide may be held above the spirit lamps, near enough to gently boil the alcohol which remains in the tissues of the section.

Tiny bubbles in immense numbers will issue from its tubes and cells, and will be replaced by the balsam. The bubbles will all come out from under the cover after awhile.

The specimen is now ready for the label. The latter should be as large as the slide. Its middle must be removed so as not to cover the *object*, but may hide every other portion of the glass cover. Now the name of the specimen must be written on the label. To show "how I do it," I will copy one of my labels. "Up. 1st bi. sound. 14 yrs. old, extrd. for Reg. Root, x sec. 1st 1-5 from apex." It is then examined by the mi. under ¼ inch power, and the following additional description written on the label: "Fine cementum; dentine tubes. Cellular."

Now we must have some paper boxes to hold our specimens, a little longer and deeper than the width of the slides. The box will be an inch wide, and will contain ten slides set on their edges. These are placed in the box, and on one end we write "1 × 9." The next box is marked 10 × 19, and contains ten specimens. To be complete a blank book may be procured and used as a catalogue, and so after awhile you will write, in a ruled margin of the page, the "No. 500," followed by three or four lines of description, copied from the label and added to by subsequent examination of the specimen under the microscope.

Sections of teeth should be made lengthways as well as across the tooth, both of crowns and roots; and oblique sections also. Only in this way can we get anything like a correct knowledge of the structure. Sections should also be made of every variety of *diseased* teeth.

Those who have no microscope and wish to know more about them, can obtain a catalogue from Jas. M. Queen & Co., New York or Philadelphia, by writing for it. I would recommend their "Students' Microscope, No. 1665." Price, $100.—[*Missouri Dental Jonrnal.*

ANÆSTHESIA TWO CENTURIES AGO.—The practice of anæsthesia in ancient surgery is referred to by Middleton, the old dramatist, 1657, thus:—

> "I'll imitate the pities of old surgeons
> To this lost limb, who, ere they show their art,
> Cast one asleep, then cut the diseased part."

BENZOIC VERSUS SALICYLIC ACID.

By R. Rother.

In spite of the tremendous *furore* that a number of interested writers are making about salicylic acid, the star of this novel and noteworthy substance is even now declining. Most of the glowing reports extolling its wonderful powers were baseless exaggerations, to say nothing of the pure fictions that were manufactured and circulated regarding the disinfecting properties of salicylic acid. The writer had been using benzoic acid as an antiseptic and preservative of certain decomposable solutions with most satisfactory results, as, for instance, in solution of magnesium citrate, both in the form of a concentrated stock solution four times the officinal strength and the ordinary officinal state; then the "cream syrup" for soda-water, also a concentrated coffee syrup, one to sixteen for soda-water, solutions of citric and tartaric acids, and several fermentable officinal syrups. The first application the writer made of salicylic acid was in the preparation of syrup of althaea. An excess of salicylic acid was employed, more than the water could dissolve. In less than a week the syrup was covered with an extra heavy and exuberant growth of mold, and several days later it passed into active fermentation. The next trial was with red raspberry juice. After the bruised berries had fermented twenty-four hours, one drachm of salicylic was added to a quantity of berries representing three gallons of juice; six hours later the magma was pressed, and then the fact became apparent that the fermentation was still active—in fact, from the profuse evolution of carbonic acid, it seemed now to be in its most energetic condition. Another drachm of salicylic acid was now added, but, six hours later, fermentation had not ceased; and, moreover, from the very perceptible acetous odor, the inference was at hand that the acetic fermentation had also begun—one drachm more of salicylic acid was then added, which either stopped the alcoholic fermentation, or this ceased simply from the exhaustion of fermentable material. But twelve hours afterward it was found that the acetic fermentation was raising havoc with the juice, and an additional drachm of salicylic acid was incorporated. It, however, soon became evident that even now the juice was rapidly spoiling, and the writer, in order to save it in its already deteriorated condition, speedily mixed a part of it with four per cent. of

alcohol, and converted the remainder into a dense syrup by the addition of sugar.

The writer found that neither salicylic nor benzoic acid will preserve milk unless added in excess of the natural alkalinity; a comparatively large amount of either will then be required. A mixture of one pint of milk, one pound of granulated sugar, one fluid drachm of tincture of vanilla, and five to ten grains of benzoic or salicylic acid, makes a very permanent "cream syrup;" in fact, such a mixture will remain sweet for several days, even in the hottest weather, and the writer has not had a single case of "sour cream" during the whole season. It was, however, found that a small remnant of milk or "cream" remaining in a large bottle became putrid within the space of a week, and although salicylic acid was added, equal in quantity to the decomposing mass, the offensive effluvium was not diminished in the least, however prolonged the contact might have endured. This circumstance is ample illustration that salicylic acid is by no means a disinfectant.

The conversion of lactin into lactic acid, then into butyric acid, and ultimately into the more odorous products of putrid fermentation, is either checked or entirely obviated in the presence of a perfect antiseptase—that is, any agency which counteracts the effects of septism, and during which action the antiseptase remains indefinitely intact; but an antiseptase, which is also a disinfectant, must finally disappear entirely when placed into an already decomposing body, since the process of disinfection consists partly and importantly in a chemical disintegration of the various elements concerned. Hence, as salicylic acid does not itself decompose in a putrescent mixture, it cannot consequently be a disinfectant, even if it is to a certain extent an antiseptase.

Prof. Salkowsky, of Berlin, has quite recently demonstrated that salicylic acid, in *concentrated* aqueous solution, will temporarily suspend the appearance of putrefaction, but *cannot prevent* its occurrence, and that it has no deodorizing qualities whatever. If decaying fluids are mixed with salicylic acid the odor still remains entirely unchanged. There is really no apparent reason why salicylic acid should possess deodorizing properties, since such action can manifest itself in three different ways, namely: (1) by a destruction of the volatile products of the decaying substance, as, for instance, through the action of potassium permanganate, chlorinated lime and sulphurous acid; (2) by absorption, as with charcoal and in less degree by various other

porous materials, to which also belong bodies producing precipitates in albuminous fluids ; (3) by concealing the putrid odor, as with carbolic acid. Salicylic acid is not possessed of strong chemical affinities, neither does it produce precipitates, nor has it an inherent odor. The action of salicylic acid does not originate in a splitting up into carbolic and carbonic acids, as Rolbe supposed. The inadmissibility of that presumption is apparent from the fact that salicylic acid acts in weaker concentration than carbolic acid. Furthermore, salicylic acid may be recovered from putrid mixtures by means of ether, but carbolic acid is not traceable under the same conditions. *Benzoic acid is a much more powerful antiseptic than salicylic acid.* Raw meat chopped up fine or in larger pieces, when placed into concentrated solution of benzoic acid, remained perfectly fresh during a period of three months, the liquid remaining perfectly clear and retaining the odor of benzoic acid. The preservation was apparently absolute for any period. There is no difference between the effectiveness of natural and artificial benzoic acid.

Rolbe had stated, among numerous other myths about salicylic acid, that it is a much superior antiseptic to benzoic acid. The spirit of pecuniary enterprise is getting a fast hold upon the German chemists. Every new wrinkle is twisted into proportions of wonderful importance, and directly a factory is started, by means of which, and elaborate puffs, the general market is flooded with a worthless, or nearly worthless, substance. About the time the enthused multitude returns to sober second thought, the great scientist is enabled to retire from business to the more secluded pursuits of pure science, with a handsome gain. Rolbe's notorious pamphlet, ridiculing the new notation and nomenclature, simply because it was of French origin, and because Wurk, in excessive eulogism, pronounced chemistry a French creation, founded by Lavoisier, is a pretty sample of what can be achieved on the field of pure science.—*Pharmacal Gazette.*

THE MONKEY AS A DENTIST

(See Notes for explanation.)

JOHNSTONS'

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PHYSICS AND PHYSIOLOGY.

Read before the American Academy of Dental Surgery by W. S. Elliott, D.D.S., Goshen, N. Y.

In considering the laws controlling the affections of matter, we must necessarily come in contact with those subtleties embraced in the higher departments of science, and while we carry our considerations to that form of matter having vital functions, our highest thoughts become insufficient to realize fully the positive status of its being. Modern philosophy, however, has enabled us to advance our understanding of the relationship between the governing principle and the phenomena as manifested in organic nature.

That vital force, so designated, is in its essence different from that which governs inorganic matter, is a proposition I am not prepared to defend, for it is to be presumed that original Intelligence instituted no complication of laws whereby the rock or the rose and man should be differently controlled. There was *one* force which received its energy in "the beginning," and that force *moved* as a spirit upon the waters. It entered into and vitalized every created thing, and according to a plan it individualized by special degrees and forms of energy. The light which came out of darkness was a phase of that energy; it moved in obedience to the Divine command, and became an element in the creative act. Heat, Electricity, Magnetism, and Chemical Affinity were correlatives, all being elements of that one Spirit, and each a mode of motion. We cannot escape this primal feature; the wind, and the waves, and the rolling clouds, the sweep of the planets, and whirling suns—all present this one feature of *motion*, and which too pervades the

minutest fragment of creation. The tiniest blade of grass, or a grain of sand, is thus characterized, and it is no more the province of our earth to dash through space than for the thistle-down to float upon the summer air, or the mote upon the sunbeam.

Motion indicates change, and this change is the eternal attribute of all matter. From life unto death and to life again constitutes the round of energy, and in all this transformation nothing is lost, nothing gained.

The fact of the positive correlation of these various forms of the great moving force becomes our guide in our professional studies and observations, and the principle must not be lost sight of, for it is as a light piercing the very darkness of ignorance in that which pertains to physiology or pathology.

It will be inferred, then, that vital force is physical force—not a modification of the latter, but a fulfillment of that Intelligence embodied in a proper balancing of the several factors as obtained in a perfectly healthful condition of body. Let us endorse, then, the theory that vital phenomena, as well as that presented in inorganic matter, is but a form of motion, and let the mind go out to an appreciation of those features which are more distantly removed from the grasp of the ordinary sense, and in which our propositions rest. We would thus name these several factors of life, and learn how they conserve health, and their possible influence in establishing and maintaining disease. We would study the atomic law, and that which pertains to molecular structure, and observe how out of structural organization grows function, and out of function, mind and its attributes. The energy, then, that was originally pronounced by the Word is the law of life, moving yet onward to an unperceived and unappreciated consummation ; and we, the subjects of its workings, in its, as yet, most perfect attainment.

If these forces are concomitant with vitality, then a true balance is necessary to a normality of function, and a healthful status is obtained to the maximum of original design.

It is not to be presumed, however, that in these higher structures these forces are so far individualized as to become especially tangible apart from the correlation which results in animal function. Heat, perhaps, is the most apparent, yet it does not transcend the other factors in its due proportion of energy. Through its influence a proper viscidity of the fluids of the body is maintained, and a sensation of agreeable warmth is experienced. Its evolution is the sequence and concomitant of molecular change ; it is an exhibition of a form of energy held in equilibrium by the counterbalancing forces which enter

into the nutritive act. Is there a tendency to evade its normal energy? This can only be through a disruption of the plan of organization; then, as in the process of decomposition, animal heat is changed to chemical affinity, which, as a plea to the circumstance of conscious death, is now transcendent. From this action again arises heat, but which is not now subject to that domination which is compatible with vitality.

In pathological conditions we observe the evidences of departure from the mean thermometrical standard. This fact lends its significance to the practitioner, since he will refer to the physical aspect of disease while electing the method of treatment.

The elimination of light as an evidence of its agency in the vital economy is not so apparent, but of its absolute necessity to a proper maintenance of health is as evident as life itself. Common observation will note the effects of living in illy lighted rooms where the sun's rays scarcely ever penetrate. A blanched cheek betrays the condition and evinces a fair sign of diminished vigor.

Light is that form of force, or mode of motion, which is correlated more especially with chemical affinity, not solely, for out of it is evolved heat as well as magnetism and electricity. But a further significance is given to the influence of direct sunlight, since we recognize it not as a simple, but a compound energy, and in its fullness only does it become the truly vivifying agent. I refer to its spectra. Herein the wave undulations are as varied as are the resultant colors, or partial reflections, which cannot be separately utilized in the physiological process.

We should not, therefore, curtain our windows to the exclusion of the direct rays, nor so furnish our rooms that the spectrum shall be to any great extent absorbed.

Molecular polarization seems more particularly under the governance of electrical and magnetic forces; and when we consider that the tissues of the body in their vital operations are continually evolving these forms of energy, we would only wonder that the evidence is so obscure as to be detected only by the most careful search. The experiments made, however, by many scientists, prove that every constituent, at all times, and under all circumstances, is in a state of electrical disturbance, and every change exhibits an expenditure of this force, again to be eliminated in other modes. In crystalline formations the results of these combined forces are especially apparent; herein a directive guidance is given to the molecules which are disposed after a

manner which becomes inherent by their atomic nature ; and thus, too, the nutrient elements of animal tissue are controlled and directed by the same energy, to the production and renewal of cells and organs.

Electricity and magnetism are thus the weavers of tissue—they plane the facets of the crystal as well as proliferate the cells that functions the mind.

We observe also in its due balance of energy chemical affinity. This is the cunning alchemist which would reduce the inappropriate to the appropriate by a needed modification of the elements that enter into the structural organism, and according to its limit of association, acts its part in the general physiological process. This form of motion is evolved out of heat and light, and yet not less truly is it out of electricity and magnetism.

In this our enumeration of the modes of motion, we have been limited to six, but only since these are the more appreciable and the better understood. Shall we claim that they are all of Life? We forbid ourself this assumption, and carry our convictions to a more exalted estimate of the "crowning work," than that which is embraced in these our highest considerations.

In reference to the conclusions arrived at as to the nature of vitality, I expect to meet the charge of error in apparently assigning no higher attributes to the animal function than those which are accorded to unorganized matter ; but this charge must remain entirely gratuitous until those subtle mysteries attending the common affections to which we have referred are free from questionings and doubts. The statement at best is general ; it is so in regard to each counted form of force, for, as with light, for instance, we have noticed its divisibility, and the knowledge that has grown out of our analysis of its spectrum is as astounding and as mysterious as that which refers to the vital phenomena. Heat, too, presents itself in the most wonderful and varied degrees of force—from blinding incandescence to frigidity. It becomes thus a multiple agent, the limit of which is unmeasured and unmeasurable.

Chemical affinity is also a compound force, as proved in its isomeric and allotropic tendencies. What shall be deemed a greater vagary, or more wonderful, than that the most brilliant scintillating diamond, charcoal, and graphite are composed of one and the same element ; or that butyric acid, the rancid principle of butter, so offensive to our taste, has the same equivalency as acetic ether, a pleasant, fruity liquid used in imitation of various botanical flavors.

In these varied facts rest the intricacies which baffle our human un-

derstanding, and as in proportion to the depths of our inquiries, so is the mystery enhanced, while the conviction is ever forced upon us that there is a higher Intelligence which plans and controls, and which is dominant in the lowest as well as the highest forms of matter.

Since, in our investigations we have come in a measure to appreciate the workings of the law, yet the persistency of that law is wholly inexplicable, and to whatever stage of development we may arrive, and to whatever degree of perfection we may understand the physical and physiological processes, still Life will remain ever the same unexplained phenomenon.

As instances of recent scientific advancement in physics and physiology, we may note that substances which were considered the products solely of vital action, have been produced artificially in the laboratory, of which we may mention urea, formic acid, cyanogen, leucine, creatine, taurine ; and in the vegetable world, oxalic, valeric, malic, and tartaric acids, oil of garlic, mustard, &c. ; yet these are but the products—the cast-off debris, as it were, of organic action ; substances diverted from the vital to the province of isolated physical governance, possessing physical properties, and estimated solely from a physical standpoint. From this view it would not seem so strange that chemical science is capable of reproducing these substances directly from their component elements.

To these advanced attainments in science we congratulate ourselves ; and yet, when we shall have climbed to the summit of the Pisgah of science to behold with delightful contemplation the fair plains below, what shall we fancy, may be the rapt beauties of those fields beyond the drooping horizon that now remain to us as the unknown and unknowable !

Let those then who would cavil at our conclusions consider well the premises, and be assured that there is no cause for alarm, for scientific developement of truth cannot make life less a mystery, though we come to know to absolute perfection the entire role of physical and physiological process.

DENTAL EDUCATION.

Read before the Pennsylvania State Dental Society, by S. Welchens, D.D.S., Lancaster, Penn.

The various phases in which the subject of dental education has been viewed, and the conflicting theories which have been developed through its agitation, point to it as a question of no ordinary significance, the settlement of which must either establish dentistry as an *independent science*, or make it a *specialty* of the medical profession.

We hold that, by reason of the high claim it has to an advanced scientific status through its schools and other means of improvement, it now holds the former position, whilst the latter, though both professions seem apparently to be the offspring of a common principle, at this stage of the history of dentistry, must be regarded as a "new departure."

Notwithstanding the earnestness with which this controversy has been conducted, and the display of talent and learning in its interest, it has not yet been met in a way to promise a near adjustment, or a final and permanent settlement. The average mind of the profession has not yet reached that point of observation which will enable it to comprehend the character of the disaffection, or to see clearly the difficulties surrounding its speedy adjustment. The true solution of the question must lie in the success of the forces now in operation to dispense knowledge through the colleges, and the lessons of experience in actual practice, and such helps as are found in the proceedings of societies, together with journalistic and other scientific literature.

Meanwhile, professional jealousy, personal prejudice, and much bad humor run riot in scientific circles, whilst charlatanism is bold and defiant, taking advantage of the bickering which thus obtains, is working out a destiny of profit and gain for itself, but disastrous in the extreme to the true interests and genius of the profession.

Now what relation does dentistry sustain to the medical profession, and in view of its pretensions to a scientific independence, how is it regarded as such by medical journals and all who represent it authoritatively? It is held by many within the ranks of the profession, that by virtue of its close relationship to medicine as a healing art, and by reason of the necessity it is under to fall back upon some of the literature of the medical profession for its text books in the curriculum of study in the dental schools, it is by right a specialty of medicine.

In this relation it is regarded necessary to make the regular course of medical training a necessity in dental education, as a basis for a thorough culture in dental practice. In this view of the matter the medical profession must regard its separate training as a partial culture, and dentistry cannot be regarded in any other light than as subordinate to the great genius of that profession, and its culture must be mastered, and its degrees obtained, before a scientific status can be secured to the practicing dentist. If dentistry sustains this relation to medicine, if, indeed, it cannot stand as a separate and distinct science, and must look to the medical profession for a vital and essential stimulant, and

can live only through and by this relation, the position that a medical education must precede a dental education is not only tenable, but perfectly logical and correct. Then, indeed, to be consistent and progressive, we must dispense with dental schools and degrees, and merge its destiny into that which is claimed to be a superior and more thorough science.

If this has ever been the legitimate position of dentistry, if it has ever held a relation so necessary and vital as to bring it into such subordination to medicine heretofore, we think its present status must force out the conclusion that its proportions are too great, its genius is too self-reliant, and its energy and vitality too strong and vigorous to be so regarded now. From the period when it was compelled to stand alone, and rely upon its own resources, from non-recognition by the medical profession it has been accumulating strength, intelligence, culture, and science. Its native energy has developed a remarkable vitality, its literature is increasing, its usefulness growing, and its scientific significance at the present time rivals its older competitor for the honor and the position of its institutions of learning amid others of the age. The character and power of its social gatherings, and the spirit and genius of its literature to-day attest that there is the growth of a grand science looming up in our midst, powerful in its resources, and ambitious of legitimate recognition. It has got far beyond the age of leading-strings, and is already moving onward in the line of destiny and successful duty.

Now what claims have we, as a profession, upon the people at large? Has the last quarter of a century shown dentistry to be a laggard, or destitute of that measure of energy, and scientific culture and talent, that should obtain in a pursuit which professes to be a liberal science? Has any community suffered bodily pain, and the loss of teeth and functional energy because dentistry presumes to stand as an independent profession, and wield the machinery of an independent science?

Have we not advanced in everything that pertains to a skillful system which ought to possess good education, nice manipulating powers, fine culture and talent, and that superior judgment which must be present in grappling with disease, and propitiating the ravages of decay?

During all this time we have stood and worked out a brilliant destiny as a *profession*, with all the appliances, colleges, literature, and associations of a profession, and progressed as such to a degree that does not only awaken the admiration of the world, but that challenges the respect of all nations, to such an extent as to make the American dentist the leading practitioner, and his education a passport to the confi-

dence of the highest respectability, and the finest communities in every civilized country.

Now if dentistry was a specialty of medicine before the institution of the first college, the organization of the first society, and the advent of a separate literature, is it reasonable that as such a dependency it ever would have acquired the power it wields to-day? And in this view of the case would we be progressing by putting it back to the position it then held, and thus curbing its spirit, destroying its energy, modifying its splendid genius, and stultifying its whole life?

We think that the very idea is suggestive of a spirit of apathy and charlatanism that is unworthy of the progressive age in which we live.

Now how are we using the material within our grasp to improve the profession, and to elevate the standard of dental education and usefulness?

In what we choose to term the machinery of the profession we have three several departments, each of which is an important adjunct in the work, and all of which are capable of improvement, and must be better managed to enable dentistry to reach the high position to which it aspires.

The first is, our collegiate instruction. The curriculum of study, for the most part, as laid down in the announcements, looks well and seems to embrace all that is necessary in a thorough dental training. But how are all the branches taught? The faculties look well on paper, but have they that experience in the *principles and practice* of dentistry that is needed to enable them to teach all that is embraced in their respective curriculums in such a manner as will make their students efficient in study and masters of the theory? In this item is it not too apparent that the degree of M. D. is more valued than the D. D. S., even among our professors. It seems to daze their vision, and whether regularly acquired or not, it is so paraded on all occasions as to be necessary to give weight and character to them as professors in dental schools. Now if dentistry is a specialty of medicine, this of course is all right: but in that case have they a right to confer a degree which must in that light be regarded as of partial culture? Would it not be best for all professors in all our dental colleges to be practical dentists, and to be a little modest at least in the use of the M. D., especially when it has been conferred by courtesy.

The second department, as an adjunct to an elevation of the profession, is its literature. Is it not apparent that in this we are to a very great degree deficient? For text books and other scientific works, the

dental profession cannot claim the respectability that its position would seem to demand. We have here neither time or space to criticise any special author, or to point out any wants which would seem to be needed in this department to meet the progressive spirit of our science. *Our journals* are sustaining a leading position in the development of a literature, but for the most part they have an up-hill work of it. They have to labor to gather up such matter as is worthy of publication, and often in reports of societies they are furnished with the most unimportant parts, whilst essays and papers of merit, and the fresh living literature that is good because it is practical, which is made in the discussions, is scattered into newspapers and transactions, and only comes to the journals second-handed, and then, too, when nearly a year old. There are two things especially needed to make our journals efficient in the work allotted to them. The one is a proper and liberal support by the profession. The other—living, progressive editors.

After passing the title page we can scarcely tell, in looking over our periodicals, whether they have editors or not. The editorial department is either not there, filled by quotations, or replete with emptiness, evincing not a want of ability, but rather a want of time to prepare articles of practical value, or that they are either *novices* or *fossils*. We hope that matters in this department of dental improvement will be made lively and progressive very soon with the rest of the appliances.

The next or third aid may be recognized in our *Societies*.

And here there is not only a wide field for usefulness, but there is also ample room for improvement.

There is no instrumentality within the whole range of the profession which possesses a power of equal significance in the advancement of dentistry.

They bring men together, and in fraternal intercourse they are bound into a common brotherhood, and thus are more efficient in their scientific inquiries and research, whilst the practical and social relations there established are of incalculable value. Even the earnest and sometimes excited discussions—the differences, and apparent contradictions, and the severe criticisms, all contribute to the beneficial vitality of that jostling energy so much needed. The intellect is thus brightened, the will is aroused into action, and the purposes become stronger and more pointed, and all who attend these social adjuncts to culture and advancement are far better qualified to meet the various and complicated routine of every-day practice.

But we think that even here there is but a partial culture developed

at the expense of very important parts of the profession which are essentially necessary to a successful professional career. Filling teeth, for instance, it is well known is by no means the whole of dentistry. It is a nice artistic part, and too much proficiency cannot be acquired in it. But that is not all that is needed to make a scientific dentist, and yet it absorbs nearly all the interest in the societies, to the exclusion of almost every other consideration. Filling the teeth well is not all that is necessary to save them. And yet the very touchstone of excellence is found in the manipulation of those splendid operations which some are able to make whilst the ability to treat the diseases of the mouth, the pathological condition of the teeth, and even to judge the character and texture, to say nothing of their vitality, are kept in the background.

Instead of clinics in tooth filling absorbing so much of the time and attention at the meetings of the societies, why not have clinics in surgery or in anæsthetics &c.? At the second meeting of the society which was held at Pittsburg a few years ago two very interesting pathological cases were brought in, and whilst some differences of opinion in the diagnosis were expressed, there was no attempt to relieve by a clinic. The patients went home with no more light or comfort than when they came, and the dentists who brought them there were compelled to acknowledge the deficiencies in dental education just on this point. Here, then, is a weak point among its most important ones in the instruction of our State Society.

We think it the duty of all societies to throw as much practical light upon every phase of dental culture as possible, and when these principles and elements of a superior scientific culture are better cared for, and the true genius of our calling is thus better developed, we will then be able to stand erect in the dignity of a separate science, and demand both recognition and respect, which are, after all, the most potential weapons for the discomfiture and destruction of quackery, and the promotion of the highest and most thorough measure of dental education.

REPORT OF THE PROCEEDINGS OF THE AMERICAN DENTAL ASSOCIATION.

Fifteenth Annual Session, held at Niagara Falls, Aug. 3d, 4th, 5th and 6th, 1875.

Third Day—Morning Session.

The meeting convened at 10 o'clock. A motion was offered relative to a joint meeting of this body with the American Dental Convention next year at Philadelphia, but it was laid upon the table.

A committee consisting of Drs. J. H. Smith, Abbott and Harlan, was appointed to prepare resolutions on the death of Dr. Hill, of Norwalk.

Dental Chemistry was then taken up, and a report was read by Dr. H. A. Smith, chairman of the committee.

The first portion of the report was devoted to an account of certain experiments made during the year by Dr. S. B. Palmer, who had been engaged in investigating chemical and galvanic action upon the teeth. He assumed that in many cases when failure followed careful filling, it was due to electro-chemical decomposition of the tooth-bone, which was induced by a galvanic current set up between the tooth-bone and the filling material.

Caries is a chemical result, and the filling checks it by excluding the fluids. In some cases other materials than gold will be more effective in arresting this action. There is latent electricity in all matter, which, under favorable conditions, such as a fluid of a certain character, develops into a current which will cause a loss of form and texture in one of the elements. There is a given electrical order in tooth-bone and filling materials, which has been fixed by testing with the galvanometer, with saliva for the fluid. Gold is first, then mercury, oxychloride, dentine, tin and amalgam.

In weak acid this order is reversed in some of the elements, and gold and dentine are the extremes of the list, the latter being positive, or the element acted upon. Between elements at the extremes of the list there will be the greatest action, but only a slight one between those nearest each other ; a change of fluid or of temperature may cause a reversal of the current.

When the tooth-bone is porous, gold supplies a decomposing current ; but in those teeth, with lower grades of filling, less action is produced, and less breaking down of the tooth structure. Tin acts in these teeth to arrest the current, and is best for such teeth, while gold is best for a well organized tooth. Amalgam stands near gold, and is liable to excite a chemical action. If the mercury is not perfectly combined, it will be dissolved out around the edges, leaving pits. To make the amalgam finer is a step in the wrong direction. As regards amalgam, the physical properties experimented upon by Dr. Hitchcock, Bogue and others, though important, are not so much so as their chemistry ; they might neither discolor nor expand, yet might affect the system injuriously. Dr. Bogue concludes from his own tests, that almost any amalgam, if used intelligently, may be used safely.

The subject of bleaching teeth was treated in a portion of the report written by Prof. Cassidy. The discoloration he considered owing to the sulphides &c., which are precipitated and are insoluble. In general, the tooth can be restored, but caution must be used in applying bleaching agents, lest they injure the tooth. Chlorine gas is the most efficient agent. It is generated by the action of hydrochloric acid upon black oxyd of manganese in a small flask. The gas is conveyed to a receiver, from which it is applied to the tooth by a glass tube drawn to a fine point. The receiver is inverted and the gas descends into the cavity, which must be kept moist, otherwise the gas will not bleach. It should be followed by the use of an alkali to neutralize any acid, and the dam should be used to protect the mouth and nostrils of the patient from the irritating effects of the gas.

After the reading of the paper, Dr. Palmer, of Syracuse, spoke upon the subject of the report. He thought that different classes of teeth required different modes of treatment. Those in which the bone remained solid, required simply filling, a mechanical stopping of the hole, which preserves the tooth; but those teeth which are soft and chalky needed antiseptic treatment; six-year molars were often in such a condition, and then gold is not only not the best, but really injurious. He thought the principles of galvanism applicable to these cases. There is a battery formed when gold and tooth-bone are brought into contact, particularly in porous teeth. A galvanic action goes on around the filling, which becomes loosened by the destruction of the walls. This action upon the tooth-bone can be measured with the galvanometer. When tin is used for filling, it acts to preserve the tooth-bone; the electrical action is then such that the tin is consumed away, and not the dentine. There is but little galvanic action when tin is used, because it is in very near the same electrical condition as the dentine. With amalgam there is a great deal more action; amalgam stands near to gold in this respect. If amalgam was made finer, it would render it all the worse electrically, and would be a step in the wrong direction. There are but few cases where amalgam should be used, but when used it should be in accordance with chemical laws. There cannot be a perfect union of the metals in amalgam, until after the crystallization, and there will be mercury left that will remain around the edges, and will be dissolved out, leaving ragged edges. He had known a gold plate to salivate a patient, which was owing to the electrical condition of the patient's mouth. Boiling in soda water had relieved it, and in a short time the system adjusted itself. This was a remarkable case.

The galvanic current does not destroy, but only shows that destruction is going on, through chemical action. In reply to a question, he said that the reason why the dentine was generally destroyed around the gold, when an amalgam and gold filling are in contact, was that there was an alkaline current about the amalgam and an acid one about the gold. Whether the chemical action preceded the galvanic or not, he could not say, but it was immaterial, as the two were almost simultaneous.

Dr. Taft asked why there was sometimes persistent pain after amalgam fillings were inserted, which only ceased when they were removed?

Dr. Palmer said that it was on account of a different electrical condition. Gold was the proper thing in these cases, and not amalgam.

Dr. Chandler asked Dr. Palmer what he thought about varnishing the interior of the cavity with copal, &c., to act as a non-conductor, as recommended by Mr. Fletcher?

Dr. Palmer said that any varnish would fill up the porous dentine, and would answer the purpose.

Dr. Osmond said that an acid condition of the buccal fluids was present when the dentine was decomposed around fillings. The old-fashioned amalgams combined with the tooth like nitrate of silver. Amalgams which had a large proportion of tin, did not shrink nor discolor so much. He rarely used amalgam, and did not wish to defend it. Gold fillings were often rendered useless by being in proximity to amalgam; as Dr. Watt said, it was a "thunder-mill" erected in the patient's mouth. In very acid mouths, when there is a great deal of trouble, he varnished sensitive cavities with silicate of soda, and touched with sulphuric acid and water, which, after being washed out, left a film of silicate upon which he could insert the filling without pain. He had found that this practice produced very gratifying results.

Dr. Taft thought Dr. Palmer's investigations valuable, but hoped and believed he would go farther in his present course. We should not be satisfied with his investigations, but each one should conduct them for himself. He thought amalgam never had been, and never would be successfully used; but if it is to be used, it should be as thoroughly understood as possible. He had heard from dealers that since this discussion had been going on about amalgam, by Drs. Hitchcock, Bogue, and others, the sale of amalgam had increased largely; but those papers, if they proved anything, proved that amalgam is not fit to fill teeth with. The great question in using amalgam is not whether it will expand or contract, but what its effects are upon the system, and in the direction of Dr. Palmer's experiments. There is a large field for investigation here.

Bleaching teeth is but little understood. We leave out of view the agent that produces the discoloration. There are several things that produce it. Some change of color always accompanies death of the pulp, especially in soft teeth. The soft solid portion undergoes a change, and the larger amount of this material there is, the more difficult will be the restoration of color. What should be used to effect this, will depend upon what the coloring matter is. Almost anything would both fail and succeed. Chlorine is the great bleacher, and as far as it can be made to penetrate, it will accomplish it, but if a tooth is blackened throughout, nothing would remove it. Sometimes mistakes are made in the effort to bleach. He knew of one tooth that had been bleached with chloride of lime, till the crown came off.

Dr. Rehwinkel thanked Dr. Palmer for his experiments, which he said explained a great many things that he had never been able to explain. He knew that he never failed to excavate thoroughly, and that he filled with the greatest pains, but he found on inspection that his work suffered from wear and tear. He found faultless fillings which the tooth had left. The closest joint would be undermined. Sometimes after fillings had remained good for years, there seemed to be suddenly set up a morbid chemical action which caused destruction. He thought tin possessed a medicinal action upon the tooth-bone, and that in children's teeth it was better than gold. He had had suspicions that the destruction he spoke of had been caused by agencies beyond our control, and what Dr. Palmer had said, had confirmed his suspicions. As to amalgam, it should be handled with kid gloves. The experiments of Dr. Bogue, and others, had proved that the maker's reputation is no test, but it must stand upon its own merits. He hoped amalgam would never be raised to the dignity of a discussion. If it was discussed, it would be a curse to the operative department, as rubber had been to the mechanical. But he would not be connected with any Society which forbade him to use it. When he uses it, he wants to know why he does so. He looks with dread at the present tendency of the question.

Dr. Hunter, of Michigan, said that in the small town where he practiced, people had been taught by traveling dentists that amalgam was as good as gold, and it was only for "looks" that gold was used in the front teeth. He had, however, become so disgusted with amalgam, that he had not put in a filling of it since 1874, but his course had resulted in his losing some of his patients. The traveling dentists could do work quicker than he could, even with improved facilities, and do it without

pain. He thought these difficulties which were found in a small place were worthy the attention of the Association.

Dr. Daboll spoke of some teeth which he had seen, which were filled in Berlin. They had a peculiar appearance, and on investigation he found that the fillings were a combination of gold and tin. Since that time he had used this combination himself, and after two years had found the result highly favorable.

The subject was passed, and Dr. Stockton, of Newark, read the report of the committee of operative dentistry, a portion of which was written by himself, and the remainder by Dr. S. H. McCall.

Dr. McCall's report was entirely upon instruments and appliances. Burring engines were first mentioned, somewhat at length, as heading the list. The Elliott Suspension, and S. S. White, were considered the leading styles, and the merits of each were alluded to. Attachments and equipments for each were specially mentioned, such as air and water injectors, burs, polishers, disks, &c. It was to be feared that many purchasers of engines did not avail themselves of these instruments, but attempted to get along with a scanty outfit. Bonwill's disk, and Hickman's disk carrier were mentioned.

Motive powers, electricity, steam, springs, and water, were spoken of, the last being considered as more advantageous for those who have water in their offices than any of the others.

The several varieties of mallets, the electric and others, were spoken of. The S. S. White plugger for the engine, was deemed to be the best in that line, and the writer had used one similar to it, a year, driven by a Backus water-motor with perfect success, the work being done easier for both patient and operator, and the patients decidedly prefer it to the other methods.

Rubber Dam Clamps of various improved patterns; Jarvis' separators, Bogue's tape forceps, and Magill's rubber dam buckle, were briefly mentioned. In view of the multiplicity of instruments it was deemed that a caution was necessary lest operators load down their tables and confuse themselves, when a few well-selected instruments would do better service.

Dr. Stockton's report was a continuation of the same subject, being mainly devoted to the electro-magnetic mallet, and the Backus water-motor. These instruments were regarded by the writer as extremely valuable. The mallet had been endorsed by leading men in the profession as second to no appliance save the rubber dam. From one-half to two-thirds the time is saved by it; delicate walls are preserved, and

the instrument is perfectly under the control of the operator, who is greatly relieved from both muscular and nervous exertion. Dr. Bonwill was given the credit of having been the first to conceive and produce the instrument, which he had dedicated to the profession; for which deed of magnanimity he should be honored. His diamond reamer was also a very useful appliance.

The Buckingham, the Gaylord, and the Swartley automatic pluggers, were briefly mentioned.

The Backus motor was then taken up, and eluogized as the best calculated of all the appliances to preserve the health of the operator, and prolong his life. With it, and the rubber dam, and the electric mallet, dentistry was said to be made easy, and so attractive, that old men would grow young again in its practice.

After the reading of these reports, Dr. Taft said that if some caution were not exercised, there was danger lest these new things run away with us. About all there was in operative dentistry in these days was to have something to bore with! In attempting to do everything with the dental engine, some would bore and grind away more than they ought, and with less precision than it could be done by hand. Young men particularly failed in precision, and cut as though teeth were devoid of vitality. He thought they needed caution. He liked the machines, but thought we should improve our knowledge of the points necessary for success, as well as improve the machines. We should understand the condition of the parts, and how to control that condition. All things should be valued as they deserve, but we should not run wild on instruments and appliances.

Dr. Atkinson said that want of knowledge in operating caused the loss of the pulp, and the necessity for bleaching. A poor conductor should be substituted for the lost dentine as far as possible. If oxychloride is used, it should not be brought into contact with the pulp; he uses a mixture of oxide of zinc and salicylic acid next the pulp, and filled over it with oxychloride.

Dr. Abbott thought that young men should learn to do the work well by hand before using the engine, and should study the anatomy of the tooth, and know how far they could cut. Thousands of fillings had been put in upon a live pulp, which had died, and the teeth had to be bleached. Amalgam does not enter the substance of the tooth at all, but the discoloration is owing to the semi-fluid substances of the tooth. He had never seen the water-motor, but thought the Bastet engine would be the best. Thought pulps might be saved even with oxychlor-

ide in contact with them. Hill's stopping was the most useful preventive of thermal changes, and he never fills without it where there is room to insert it. Uses a solution of gutta percha in chloroform in root canals; did not believe in enlarging canals, and thought it not safe to attempt it in many cases, and that many teeth are ruined by drilling through.

Dr. McKellops said the canals could be successfully filled without enlarging, and exhibited specimens which showed that a solution of gutta percha and chloroform would enter the canals. He had never read nor heard of this method till Dr. Bowman brought it forward at St. Louis. He carried the solution up with a broach and a shred of cotton, and applied pressure with a large-pointed instrument, and a piece of softened gutta percha, and it would enter every crevice.

Dr. Rehwinkel: A tooth pulp is a very delicate tissue, and will hardly tolerate so strong an agent as chloride of zinc, which is used to destroy tissues. How could it preserve this tissue while it destroyed others? Dr. Atkinson was more responsible than any one else for the mischief which had followed the use of this agent, and more mischief had followed from it than from any other remedy. It is a sneaking assassin, and not entitled to respect as an enemy that attacks boldly is. In a strong constitution the pulp may not die, but it often was dead and mummefied when it appeared to be a brilliant success. The cases reported were not of long enough standing, and were not opened and examined. If it did not give trouble, it was inferred that the pulp was alive. We should not always douse a pulp with carbolic acid, especially when it is freshly exposed. We do not wish to cauterize when we want union by first intention. Gutta percha in chloroform is as good as anything for capping. Oxychloride should be kept from the pulp with paper or something of the kind, and then it might be risked. Dr. McKellop's specimens are the best he has seen. It has become necessary to defend the use of anything but gold in roots, but it is not under all circumstances the best, either for roots or teeth. Oxychloride is useful in roots to mummefy any portion of the pulp which remained.

Dr. Atkinson defended himself against the charge that he was responsible for the mischief which had followed the use of the oxychloride of zinc. He was not responsible for men understanding through their elbows. He had published *his* method of treating exposed pulps in 1862, and pursues the same course now, except that he uses salicylic acid instead of creasote. He makes a pool of it over the pulp and then drops creamy oxychloride over it, and then covers with a stiffer oxy-

chloride, and afterwards either with gold or collodion. He would only assassinate error.

Dr. Rehwinkel said it was a fact, and we all knew it, that Dr. Atkinson used oxychloride in immediate contact with the pulp.

Dr. Atkinson said he did not, and asked what he meant by immediate contact.

Dr. Rehwinkel replied with a motion of his arm around Dr. Atkinson's neck, and asked him if that wasn't immediate contact! (Laughter.)

Dr. Atkinson : It is only the contact of your coat sleeve!

Dr. Rehwinkle : The coat sleeve represents the creasote, I suppose, but it is no fitter for contact than the other.

Dr. Morrison then read a volunteer paper upon the subject of operative Dentistry.

Dr. Morrison's paper was upon the replantation of teeth, giving a history of several cases in which this operation had been performed. The first was in the mouth of a delicate lady of 40 ; the tooth was badly decayed on the posterior surface, pulp exposed, and roots covered with tartar. To avoid the operation of filling in the mouth, which the patient was unable to endure, the tooth was extracted, filled, and replaced. Some pain ensued during the next few days, but after five months the tooth is the firmest in the arch, and the gum is more perfectly united to it than it had been for years. Several other cases were given, in each of which the same plan was pursued. The roots were filled with gold wire, and the crowns with oxychloride and gold. Some of the cases were spoken of as doubtful. A right lower first molar was broken in extracting, the root being enlarged. A portion of the crown was cut off and the remainder filled, and the one root replaced, though a portion of the point had been broken from it. It is now doing good service.

Dr. Morrison had tried this operation in nineteen cases, and of these only four had been extracted after filling. He claimed that in all cases where the pulp is beyond restoration to health, or the tooth has an incurable fistula, a more successful operation could be made, and more of the tooth saved by this plan than any other ; and that a large number of teeth now lost by accident or otherwise might thus be rendered useful.

After he had concluded, the discussion continued.

Dr. Morgan : Death is not always the result of using oxychloride. He had found the pulp living twelve months after applying it.

It is hardly practicable to fill roots as perfectly as these specimens are filled. Does not feel sure of what he is doing in filling roots with a plastic material; you may force the debris or the filling material through into the soft parts; this had been done and caused the loss of the tooth in more than one case.

Dr. Abbott: Pulps can be and are saved when oxychloride is in contact with them, except a film of albumen. He had been able to save sixteen out of seventeen every time. It makes a great difference how the pulps are handled. They must not be in an irritable condition. He could not succeed in preserving pulps with gutta-percha, or cork or paper; oxychloride is better than anything else.

Dr. Rowls, of Kentucky, fills roots with lead wire fitted to the canal, which he thought exerted a therapeutic influence. Oxychloride should not be placed in contact with the pulp when it is inflamed; it would astringe the pulp and push itself through. The carbolate of albumen when formed is either absorbed or left *in situ;* and if absorbed there would be a space left which would cause the pulp to be strangulated by the edges of the cavity. Something that is not an escharotic should be used, and it should be a non-conductor, and firm enough to sustain the permanent filling. We have not such a material. Plaster of Paris would answer if it was more durable. The pulp must be protected from the oxychloride.

The hour fixed for the election of officers having arrived, that business was taken up. After several ballots the following result was announced:

President, A. L. Northrop, New York; First Vice-President, H. J. McKellopps, St. Louis; Corresponding Secretary, J. H. McQuillen, Philadelphia; Recording Secretary, C. Stoddard Smith, Springfield, Ill.; Treasurer, W. H. Goddard, Louisville, Ky.; Executive Committee (new members) L. D. Shepard, Boston; T. L. Buckingham, Philadelphia, and M. H. Webb, Lancaster, Pa.

The action of this body in 1872, fixing the place of meeting in 1876 at Philadelphia, was taken up and ratified, and the meeting then adjourned.

EVENING SESSION.

Dr. Rowls continued his remarks on operative dentistry. He thought Dr. Atkinson's method of applying oxychloride nearly correct, but also that what Dr. Rehwinkel said was true as regards soft teeth. There were very few teeth which would bear oxychloride in contact with the pulp, though creasote had been first used. If amalgam is used over

oxchloride, it would form the bichloride of mercury and cause the death of the pulp; this would occur unless the oxychloride was well dried out before applying the amalgam. Uses oxychloride for filling roots, introduced upon cotton, with which it hardens, and it goes as near the apex as any other material. We ought to endeavor to save a portion of the pulp alive if possible; he would remove down to healthy tissue and leave it, and thought there was a better chance of success.

Dr. C. R. Butler: If we are going to practice by machinery, we might as well be machinists at once. Patients do not like to be made a machine shop of. It was a wrong idea that there must be a machine for everything, and it was not scientific. The facility with which we can cut, induces us to cut too much, especially young operators, who are in great danger of doing damage with the engine. The gold must be packed too by machinery. More teeth have been lost by over-packing than by under-packing, in the last few years. They have been packed to death. The walls are powdered and leave the fillings, and they ought to do it, for there is no wall there. There is no chemistry about it, only the miserable mechanics. No tooth will stand the force and concussion necessary to put in hard gold fillings without being powdered. The amount of force applied is not appreciated. We may be overdoing the matter of machinery. There is no advantage in mixing gold with tin-foil. The two metals would be likely to give rise to galvanic action. If cavities in soft teeth are well cut out, and well filled, there is no danger of their being injured by chemistry. Many operators have too many instruments, and exhaust themselves making extra movements before they are ready to begin.

Dr. Abbott said that amalgam fillings sometimes did good service, and some men could save teeth better with it than with gold. He rarely used it, however. Would recommend some men to use gutta percha. Hammering gold against the walls is what produces these chemical changes; the walls are broken, and the break grows larger. Does not believe in screws, and thinks there is not one tooth in a thousand which cannot be better filled without them. They are liable to be knocked loose and break away the tooth.

Dr. Flagg thought he had been removed back twenty years, in listening to the discussions. He thought oxychloride required a special skill to use it successfully. Gutta percha also takes skill, and some men have skill to work one and not the other. Iodine and creasote and thymol and those things had passed away and had their day, and now the only thing was *Silly Sally's Acid!* (Laughter). That is

omega No. 3, and nobody could have an omega No. 3, but Dr. Atkinson! He supposed that he had himself tried to save more teeth than any other man, and had saved an everlasting lot of 'em, and another everlasting lot had died, and he knew they were dead because he *smelt* 'em! He thought some plugs would fail, though put in as an Abbott or a Butler can do it. The saving of pulps depends upon the patient and the operator, and upon the climatic condition very largely. He thought in the miasmatic region of Philadelphia that he could hardly save sixteen out of seventeen, as Dr. Abbott said he did; in fact he was afraid he lost sixteen out of seventeen. He thought oil of cloves the best thing to bathe the cavity with; it was very soothing and not escharotic. Creasote almost always causes trouble in an irritable tooth, but there is no agent so soothing as oil of cloves, and it was useful in relieving pain caused by applying rubber dam. It was his omega No. 3. He had been told by a dealer that he had sold 1,000 oz. of amalgam to one man at one time, and it was not all used by the *poor* dentists who were not here, either. Amalgam is the best plastic filling known. The papers read at New York were the merest bosh. He had had special facilities for investigating the matter, and the analyses were not at all correct. He had packed 1,000 glass tubes with amalgam, and sometimes the filling would leak and sometimes it would not. They all leak some, however, but if filled dry there will be no serious leakage. If the amalgam is washed it will always leak in less than two minutes, no matter whether it is with water or alcohol, or however carefully dried. He earnestly advised not to wash amalgam; it must be worked dry, and the cavity that is the dryest will succeed best. All the amalgams in market are much alike, and it is not strange that each should have its friends. Amalgam should be packed by tapping, not pressure, and the button should be kept in the hand while using it, to keep it warm. The last piece should not be squeezed dry, but the surplus mercury should be wiped off. He thought a great deal of solicitude was manifested in regard to the young men and their use of drilling machines; he would say, let them go on boring, boring! Adjourned.

VERNON GALBRAY.—The History of a Quack Dentist. London, E. T. Whitfield, 178 Strand, 1875.

This little book is fairly reviewed by our London correspondent, and therefore we omit extended notice of it. It undoubtedly belongs to what is known as "yellow covered literature," but since it describes the ways of one calling himself a dentist, it will be read with interest by many dentists.—ED.

DISCUSSIONS OF THE AMERICAN DENTAL SOCIETY OF EUROPE.

Hamburg near Frankfort, August 3d, 1875.

Reported by C. M. Wright, D.D.S.

ON THE FILLING OF PULP CANALS AND CAVITIES.

Dr. Jenkins (Dresden): It happens to me to be obliged to fill occasionally these pulp cavities and canals, even since the introduction of the late methods of capping and preserving alive the pulps of teeth. Has tried nearly all the well known methods of filling these cases—and nearly all the materials that have been recommended from time to time by the profession—but uses from preference now, gold, in all the cases he can possibly apply it. In some tortuous canals still occasionally employs cotton saturated with creasote. Has not universal success—must acknowledge occasional failures even in apparently favorable cases.

Dr. Terry (Zurich): Thinks the rubber dam has facilitated the preparation and filling of many of these formerly difficult cases. Where the pulp cavity is large, uses often tin-foil in strips—performing the operation as perfectly as possible. Thinks much of the success of these operations depends, as in general filling, on the thoroughness of the operation. Sometimes employs cement. He disinfects the canals for a few days before filling, and where the teeth are discolored has had some success in bleaching, from the use of oxalic acid. In small roots of molars uses often floss silk saturated with carbolic acid. In the larger molar roots uses with success oxychloride of zinc, Guilloi's preparation.

Dr. Lynn has had considerable practice in these cases, and uses almost exclusively soft gold foil as the material for filling. Thinks gold can nearly always be used. Instead of creasote, after the extirpation of the pulp he applies condensed laudanum. That is, he has an 8 oz. bottle of laudanum left uncorked for some time, and uses from this. Has had considerable success with this remedy.

Dr. Jenkins (Dresden) uses salicylic acid in these cases with gratifying results. Prefers the spirituous preparation of this acid and packs it into the roots on cotton. Has special broaches for these cases, using much smaller and finer ones than those obtainable from the depots.

Dr. Chas. Kingsley (Paris) finds it a difficult and painful operation to excise and remove a pulp with barbed broaches—but with a smooth broach wound with a bit of silk, removes pulps without pain. Does not

consider it necessary to use arsenic for the destruction of the vitality of pulps. Described at length his views two years ago in a paper read before this Society, and published in the *Dental Cosmos.* (Readers referred to the paper.)

Dr. Brazier (Stockholm): Has had great experience in these cases, and good success. Where the pulps have been destroyed before, treats with the crystals of carbol, and fills with tin-foil or gold. Dips a cylinder of gold into oxychloride of zinc, and introduces it. Never destroys a pulp. The day has gone by when arsenic should be used, unless a dentist wishes particularly to cultivate a batch of abscesses. Leaves a little devitalized dentine as a cover for a pulp rather than expose it, in certain conditions before inflammation has set in.

Dr. Chas. Kingsley (Paris) by request, redescribed his method of devitalizing and removing the pulp, by using a very fine broach and pure creasote, and pumping the creasote gently along the sides of the pulp, cauterizing as it goes along, making the removal an easy and painless operation. In upper teeth, fills the body of the cavity in the tooth, only leaving room for the operation of pumping up the creasote.

Dr. Eastlacke (Berlin) has succeeded in cauterizing the pulps in accessible cavities by carrying creasote to the proper place by means of a fine camel's-hair pencil. Has then extirpated painlessly with the broach. In filling the roots and cavities, has used gutta percha, tin, gold, biuillios, and has found the proportion of success or failure about the same. Does not think the material of consequence.

Dr. Chas. Kingsley (Paris) uses the very same small delicate broaches as instruments for filling the canals, that he uses for applying the creasote in the devitalization process—using small pellets of No. 4 gold foil, previously saturated with creasote.

Dr. Lynn thinks that gold alone should be used as a filling material and has not the confidence in the other materials used and often recommended.

Dr. Norman Kingsley (N. Y.) Don't believe it makes any difference at all what you fill with, if the canals are only *clean.* If the apex alone is filled, and the crown cavity afterwards stopped, thinks it would do as well as any other way. This he believes, after listening to the opinions of men whose experience we are bound to consider, and whose words we are bound to believe, and who have had various favorite methods, and all have had about the same show of success. When gold was the most popular material at one time, he knew a dentist who had as good success with lead. Here is the purest and the basest of

metals used for this operation, and with about equal success. We can learn a lesson from this.

Dr. Field (London) has used gold to stop the apex, and filled the remainder of the canal with silk saturated with creasote. Has done this so that in case of necessity the filling can be more easily removed. Has had cases in Geneva where he has found it necessary to remove these fillings afterwards.

Question by the President: Has any member seen cases where bad results have followed the filling of the roots with cotton and creasote? Cases where the material may be clearly judged as the exciting cause?

Dr Jenkins (Dresden) has seen a case where he judged that the cotton was an exciting cause of a very bad palatine abscess. It had been inserted in the palatine root of a first molar where the apex of the root was very large, and though the operation may have been well performed, the expansion of the cotton from moisture caused it to protrude beyond the apex, and excite periostitis. Considerable random discussion followed this statement, many believing the trouble could not be justly attributed to the material itself when properly used.

Dr. Field thinks if this case had been treated with a pellet or mat of gold at the apex, the trouble would not have ensued, even if cotton had been subsequently used.

Dr. Chas. Kingsley does not have cases where he finds it necessary to remove the substance that he puts into a pulp canal. Therefore he fills with the idea of permanency.

Dr. Eastlacke has had to remove these fillings from the roots to save the tooth.

Dr. Williams (Geneva) has had no occasion to abandon the practice of filling roots with cotton and creasote. Thinks if the root is well prepared, anything that can be well introduced will save it, and why not cotton. Has used gold, gutta percha, etc., and has cases where he thinks it necessary to go slow, and where he may wish to remove the root filling afterwards. Therefore he wishes to make the filling of an easily introduced and easily removed material at times.

(Discussion closed).

ANOTHER TWO DOLLAR RECEIPT FREE.

The following letters explain themselves.

October 7th, 1875.

Johnston Brothers—Gentlemen: Having received a circular from that great place for circulars, announcing another wonderful discovery

in one specialty, viz., a local anæsthetic, and offering it for the wretched pittance of two dollars to any one who would enclose said sum, I at once did so, and behold the result. I have not tried it, but as no injunction of secrecy comes with it, and it is mine to sell or give away, wishing that such a wonderful thing should be "free as air," I enclose the formula to you, that you may spread it to the world, and my two dollars may not have been spent in vain.

Yours truly, C.

Office of D. B. DEAVENDORF, M.D., *Surgeon Deaf and Dumb Inst.*
Delavan, Wis., October 6th, 1875.

DEAR SIR: I am in receipt of two dollars, which entitles you to my formula for producing local anæsthesia. Hoping it will meet your highest expectation, this is your receipt as per circular.

Respectfully yours,
D. B. DEAVENDORF.

FORMULA.—Morphia, 5 grs.; Veratria, 5 grs.; Tinct. Aconite, 1 oz.; Pellitory, ½ oz.

DIRECTIONS.—After removing all moisture from the gums, saturate a pledget of lint with the anæsthetic and apply for thirty seconds before extracting.

OUR LONDON LETTER.

LONDON, October 9th, 1875.

We are into the fourth quarter of the year once more, and with it the usual changes in London life. Our American friends have come and gone, and already some of them have sent greetings from their own home to the friends from whom they regretfully parted two or three weeks ago. The London Schools of Medicine and Surgery have had "their opening day," and the Dean of the London School of Dental Surgery has beaten up his "merry merry men" and resolved to have an "opening day" also. The event came off with great eclat at Miller's Rooms, (a very old suite of rooms situated in the fashionable part of London, and devoted to public gatherings of various kinds.) The chair was occupied by Sir James Paget, Bart., who was supported on his right by Sir Benjamin Brodie, Bart., and on his left by the veteran physiologist, Dr. Carpenter. When the successful students had received their prizes, Mr. Tomes announced that a Saunders' Scholarship of £20 per annum had been established for competition amongst the stu-

dents of the school. The Saunders' testimonial having assumed this form in compliance with the desire of Mr. Saunders. An annual prize of £5 has also been given by Mr. Buchanan, of Glasgow, for the best paper on some subject connected with Mechanical Dentistry. The address with which Sir James Paget closed the meeting was admirable both for its pith and brevity. This gentleman has the power of saying a great deal in a short time, and in comparatively few words, and of saying it well and clearly. He congratulated the prizemen, but urged work upon all. He pointed out what a power the dentist had in the field of inventions by virtue of his special training. While recognizing the value and importance of money, he cautioned the student against the danger of becoming absorbed in money-making alone, and forgetting his high position as a professional man. He then went on to show how easy, and sometimes how pleasant it appeared to deviate from the truly honorable course of practice, and finished by appealing to principles which were higher than any professional laws, the observance of which would guide us aright in all things. At the termination of the address the audience, about 500 ladies and gentlemen, dispersed, the students giving three hearty cheers for Sir James, and the same for the Dean.

There seems to have been a nice little war of words going on lately in one of our journals here about the history of the New York Dental College. The first letter was evidently written by one who is familiar with the history of that institution—which, to all appearance, has been a chequered one. Dr. Abbott, the Dean of the assailed college, as in duty bound, takes up the cudgel in defense, and by contradicting a few points in the original letter, makes a fair show in favor of his school. I do not think the college will be any worse for this discussion. "Sweetness and light," the great specific of Matthew Arnold for diseased institutions, will do the college good, and as the first writer admits that things have improved lately, and the Dean is of the same opinion, we have a right to hope for better things in the future history of the New York College of Dentistry. Seeing in Dr. Abbott's letter some mention made of Mr. Turner's remarks about the college, published some two or three years ago, I interviewed that gentleman with a view to getting his views about the internal economy of the college, but he protested that he only wrote that which came under his direct observation, and had no further information whatever.

We have had an addition to dental literature here lately, in the shape of a little shilling book entitled, "Vernon Galbray, or the Empiric."

"The History of a Quack Dentist." It is an attempt to interest the public in our woeful plight by mixing up a little domestic story with the schemes of a man whose only qualification for a dentist is his unblushing impudence, backed by a soft voice, a persuasive manner, and an utter absence of anything like a conscience. The author is obviously a novice in literature, and perhaps if he had followed the wisdom of Vernon Galbray, who gets experienced men to write his advertisements, and given his ideas to be dressed up by a more experienced hand, he might have produced something more attractive. That the author's knowledge of life generally, as well as of quack dentists in particular, is peculiar, may be gathered from the following: "It was a great shock to the strictly educated youth when he found out his master was a Jew; as the son of a clergyman of the Church of England, he had been educated to regard all Jews and Jewesses as a race to be avoided, if not despised." I am inclined to think this is a point in their education which will be new to the sons of the clergy when they read it. Here is another queer bit: "Galbray's dinners soon became famous. Indeed, the Honorable Adolphus Fitzmanly was heard to remark at his club, 'Galbray is a cad, no doubt, but his dinners, my dear boy,' kissing the tips of his fingers, 'are simply delicious, and cannot be resisted.'" I should like to see the Fitzmanly, or any other Honorable, a vulgar quack such as Galbray would get to his table. Such a thing might happen if the Fitzmanly were starving, although I doubt it even then, as impecunious young gentlemen are not the subjects on which the Galbrays prey, at least in the early part of their career. The whole thing seems forced and unreal.

Here is a specimen of one of his more congenial dinner parties where Vernon is known as "Le Mo" by his brother quacks. "Come tell us, Le Mo," said one who appeared by his self-satisfied air to be a highly successful practitioner, and was distinguished by a pair of green spectacles and a squint, "tell us what is the last good thing you have done? Have you netted a hundred-pound case this week?" "Vel, gentlemen, I am afraid I must plead guilty," Galbray replied, "but the old lady vas so very particular and did require something so very superior. It was nearly as good as your sixty-guinea fee for doing nothing. Come, Sam'el tell us that story; some of our friends have never heard it, I think." "Sam'el" then tells how he made a gentleman nervous about his teeth, and "worked away for three hours doing nothing," how he made another appointment, and then another, and then "declared his task complete." And so on these worthies go, telling

each his own tale of rascality till morning breaks, and the redoutable Vernon dismisses them with a very self-satisfied reflection on his own superiority in "the ways that are dark and the tricks that are vain." The intention of the author of this little book is no doubt most praiseworthy. How far he will succeed in his object is problematical. There are large portions of the public who do not know what a profession means, and who see no more harm in a dentist advertising, than in a boot-maker, and who would look on a physician or surgeon who advertised his superior skill, as an enterprising practitioner. There are others who are never happy unless they are being cheated. They are always discovering a genius who knows more and can do more than any other body, and are ever ready to take the pretender at his word, while others look upon all professional feeling or professional etiquette or professional education, which is defined by a curriculum as so much trades-unionism. While this ignorance exists, Vernon Galbrays will flourish.

In the *British Medical Journal* lately have appeared two articles on Dentistry as a Profession, which have been reproduced in one of your contemporaries. The second article was written in reply to a letter from Mr. Hamilton Cartwright, and was certainly much less offensive than the first. I heard that the lecturer on Dental Mechanics was to take up the question and reply to the *British Medical Journal* on his opening night, and so I put in an appearance. Through the kindness of the lecturer, I am able to send you an abstract of his remarks, and as the question has similar phases on both sides of the water, you may find it worth publishing. I dare say the lecturer's views about surgeons would please Dr. Sayer, of your city, who exhibited his beautiful splint for hip disease over here about four years ago.

There is at present a great stir amongst the men in the north of England about the position of the profession. The movement has not as yet assumed a very definite form, but when it becomes more tangible I shall make it my business to post you up in the matter. There seems to be plenty to do for those who are willing to put their shoulders to the wheel. Some prefer putting on the skid, but the drag of indifference is the hardest opposition of all.

One of our Journals here has been exhibiting rather a new feature. In a recent issue were two articles which not only gave the names of the contributors at the commencement, but appended, for the sake of euphony, I suppose, were the names of the streets in which the authors live. Of course it is rather difficult for the uninitiated to see what connection the writer's address can possibly have with a scientific article.

Perhaps Sir Plagiary Puff, in the play of the "Critic," could tell us something about it. He understood all about the "puff direct" and the "puff collateral." Did he ever write to a Dental Journal?

VAGRANT.

BEAUTIES OF THE PRACTICE OF DENTISTRY.

TO THE EDITOR OF THE DENTAL MISCELLANY:

The following is a literal copy of a bona fide letter received by a dental practitioner of many years' standing, who gives probably as good satisfaction in his artificial work as the average practitioner, if not better. As a specimen of Dental blackmail it is probably without a precedent, and it is to be hoped that the example thus set will not be generally followed by "eritated" victims, else the path of the dentist of the future may not be strewn exclusively with roses, as that of the practitioner of the present is well known to be. But here is the letter, "verbatim et literatim."

C. S. S.

Mr. ——— ——— ———, Kansas, Oct 15 1875

DEAR SIR:

The contract that I made With you some years ago to make my Wife A set of Teeth and Warrant the to Give satisfacti Has Entirely Faild on your part She Has Never Been able to Wear them more than one or Two Days in a Week on acct of their eritating the Gums so She could Not stand it. We thought perhaps Her mouth Could not Be Fitted any Better But I Told Her that if I ever Com across a Dentist tha Would Warrant a fit I Would spend 40 Dollars more in Proving that Her mouth could not Be fit Professor ——— undertook the Job and succeeded the first trial He Had no trouble in Getting the impression as He Was fixed for it and understood His Business and he has gav Satisfactu He said tha She could Never Ware the teeth you made Her and that Her mouth Was not as difficult as many others tha He Had Fit Now Sir if you will send me Thirty Dollars By po office order to ——— ——— at ——— Kansas, I will Say no more about the matter as I do not Wish to Do you any injury But if you Do not See fit to Do this I Shall see if Thare is any Way to Get at you for Damage and Here I Will Give you a copy of an affidavit filed in the Probate Judges office of this co of Kansas made out by Professor ———

State of Kansas }
——— ——— } ——— ——— Being Duly Sworn Doth Depose and say That He Has made a set of artificial teeth For Mrs ——— ——— of ——— and at the time said ——— made said teeth Mrs ———

——— Had a set of Teeth that *Was* made for Her in ——— ——— By ——— ——— that said teeth are Now and always Have Been Wholy unfit for use owing to The unskillful Workmanship of said ——— ——— And Professor ——— further sais That He maks this Statement under oath as a Dentist.

——— ———

Subscribed & Sworn to Before me This 23 day of Sep 1875

——— ———

SEAL. *Probate Judge.*

the seal of the Probate Judge is upon the affidavit Now Mr ——— you can use your own Discretion in this Matter if you want to What is Rite send me 30 Dollars and I will Say Nothing more about But if you se proper to Pass it By Lightly I shall Try to Recover Damage for what She Has suffered from your incompetency as a dentist.

Yours, &c., ——— ———

If We cannot settle this matter Between ourselves I shall advertise This affidavit in the S—— County paper that others may Take Warning and Not Be Duped as I Have Been.

MUSCLE-READING VERSUS "MIND-READING."

By Geo. M. Beard, M.D., New York City.

I was so much interested in the article "On Mind-Reading and Allied Morbid Phenomena," in the August number of the *Review*, that I beg permission to say a few words in reply.

I may say, first of all, that I rejoice to have the profession take up these themes; the field belongs to us—we only are competent to cultivate it. I stated as much in a paper read last winter before the New York County Medical Society, and I am all the more pleased to see since that time two papers on the subject, written by physicians and published in medical journals—one by Dr. Gibbons, of San Francisco, and the other by Dr. McGraw. The spirit of the latter paper is so excellent and so well calculated to do good, that I dislike to be obliged to point out some very serious errors into which my friend Dr. McGraw has fallen.

The subject is too wide and too deep to be discussed in detail in a brief letter, and what I say must of necessity be put in a dogmatic form,

which to those who are in doubt on these themes may appear somewhat unscientific. Those who are interested in the general subject I may refer to my paper on "Trance," in the *Archives of Electrology and Neurology* for May, 1875, and to a companion paper on "The Involuntary Life," which will appear in the November number of that journal.

In those papers, which are parts of chapters of a treatise on the "Physiology and Pathology of Modern Delusions," I aim to give the reasons for the faith that is in me, and the arguments for the creed which I shall here lay down somewhat arbitrarily.

1. The title "Mind-Reading and Allied Morbid Phenomena" is misleading, since it carries the idea that the phenomena embraced under so-called "mind reading," mesmerism, etc., are *morbid.* This is not true, or rather it is but a partial truth, since the phenomena may be, and almost always are, *physiological.* Only a limited proportion of cases of trance are pathological, and there is no evidence that any case of "mind-reading" yet reported is in any sense a morbid phenomenon.

It is entirely possible, nay, even probable, that the power of appreciating very slight muscular tension and relaxation, such as is necessary for "mind-readers," and the power of entering into trance—spontaneous, self-induced, emotional or intellectual—may be correlated to a nervous susceptibility that invites epilepsy, but there is as yet little or no satisfactory evidence of any such correlation. It is true that Mr. Corey, the mind-reader of Detroit, has recently developed epilepsy, and I am informed that a similar fate has befallen one of the amateur mind-readers of Brooklyn; but epilepsy is a very common affection, and the power of mind-reading is by no means confined to a few. In New Haven, Hartford, Bridgeport and other cities of New England, mind-readers are (or were, after the invasion of Brown,) as plenty as blackberries.

I have seen and experimented with a number of mind-readers of both sexes, and all of them are apparently strong and healthy, some of them unusually so. Barnes, a Spiritualist, who claims to be the pioneer in this art, has been practicing it for very many years, and appears to be absolutely healthy.

The evidence of Mr. Fairfield on this subject is worth very little; every page of his book shows him to be an honest *non-expert* of the worst kind.

Further investigations conducted by experts may show that mediums who move tables and write messages through involuntary muscular action, and who become easily entranced, are more liable to epilepsy and

allied disorders than those who have no such gifts, but that would not prove that mind-reading or table-tipping or trance were of necessity morbid phenomena. The great majority of "mediums" are persons of vigor, and no more and no less liable to epilepsy than any other class of swindlers.

2. *All* the performances of *all* mind-readers can be explained by *unconscious muscular tension* and *relaxation* on the part of the subject operated on.

The facts which sustain this explanation are these:

First. Mind-readers are only able to find *locality*, and in order to find even that they must be in physical connection with the subject, who must *move* his body or some portion of it—as the fingers, hand or arm. If the subject sits perfectly still, and keeps his fingers, hand and arm perfectly still, so far as it is possible for him to do so by conscious effort, the mind-reader can never find even the *locality* on which the subject's mind is concentrated; he can only find the *direction* where the locality is. Mind-readers never can tell what an object is, nor can they describe its color or appearance; *locality*, and nothing more definite than locality, is all they find. The object hidden may be a coin or a corn-cob, a pin or a pen-holder, an elephant or a diamond, it is all the same.

A good mind-reader with a good subject—that is, one who controls his muscular movements imperfectly—will find with almost unerring accuracy most minute objects—as the head of a pin—and with a celerity and precision that at first sight and until explained are amazing.

I am a poor subject for mind-readers. Brown and Barnes, the leaders in the mind-reading crusade, never could succeed with me, and yet Mr. Blydenberg, a well-known lawyer of New Haven, who began to study the subject after my public contest with Brown in that city, almost always succeeds with me, even in finding such small localities as the heads of pins stuck in a row, or the smallest key out of a large bunch. A dozen pins may be stuck on the table; I concentrate my mind on any one of the dozen, telling no one, and Mr. Blydenberg will enter the room, get the direction in the usual way (*à la* Brown), and when he has found the row of pins he will limit the physical connection to one of his index fingers pressing against one of mine, and in this way can find the head of the pin on which my mind is concentrated, provided it be not more than one finger's breadth from its neighbor.

Mr. Blydenberg, who far surpasses Brown as a mind-reader, so far from being an epileptic, is a cool, practical, healthy lawyer, who knows just how the trick is done.

Second. All mind-readers are powerless unless they have direct physical connection with the subject. The method of connecting used by Brown, Corey and others is only one of various methods that have been used with success. When connection is made by a wire, so arranged that mass-motion cannot be communicated, mind-readers do just what they would do by pure chance, and no more ; this I have proved repeatedly.

The great flaw in the unfortunate experiments of some of the members of the faculty of Yale College, that I was compelled to publicly criticise, was that they did not make accurate comparison between what could be done by pure chance, without any connection whatever, and the actual achievements of Brown when connected by the wire.

Third. The subject can deceive the mind-reader by using muscular tension in the wrong direction and muscular relaxation at the wrong locality. This I did many times with Brown and Barnes. With Blydenberg I found it more difficult, partly because he suspected that I would try to deceive him by simulating unconscious muscular tension and relaxation.

The phrase "unconscious muscular motion," which I have used in explanation of mind-reading, is not sufficiently explicit. *Unconscious muscular tension and relaxation* expresses exactly what the subject does and what the mind-reader detects and by which he is guided—tension in the direction of the locality, relaxation when the locality is reached. There is no one muscle, there is no group of muscles, through which this tension and relaxation are developed—it is the finger, the hand, the arm, or the whole body. Very likely mind-reading might be done by the feet, but I have made no experiments in that way. The whole body or the trunk may be used, and one, two, three, four or half a dozen subjects may operate at one time.

I may introduce here a quotation from one of my published articles on this subject : "A lady with whom we are acquainted goes out of the room, and while she is absent an object is hidden. She returns, and two ladies who know where the object is stand up beside her in the middle of the room and place both of their hands upon her body, one hand in front, the other behind ; all three stand there for a moment, the two women who know where the object is keeping their minds intensely concentrated on that locality. In a moment or so this lady who is to find the object moves off in the direction where it is, the other ladies with her still keeping their hands upon her, and in nearly all cases she finds it. This is accomplished by the unconscious muscular action of

the two ladies who know where the object is, upon the person of the lady who is seeking it."

"Mind-reading" is really *muscle-reading*, and that is the term I now apply to it. Brown is to "mind-reading" what Mesmer was to "animal magnetism." The phenomena attributed to animal magnetism were known long before Mesmer's time, but he first called public attention to them; they are really the phenomena of trance, and nothing more.

The performances attributed to mind-reading were known and practiced before Brown was born, but he first called public attention to them; they really are but muscle-reading.

Fourth. A theoretical argument, derived from recent experiments in physiology, but not in itself conclusive, is that the centers or starting-points of thought and of muscular movements appear to be located in the same regions of the brain.

I was repeating the experiments of Fritsch and Hitzig when Brown visited New York and gave those brilliant and now familiar exhibitions which were to me and to physicians and scientists in general a new revelation, and the results of these experiments suggested the true explanation, which experiments afterwards confirmed.

3. "Second sight" is utterly a delusion. No member of the human race, in trance or out of trance, in health or disease, has ever exhibited any such power, even in the most trifling degree. The term "second sight" was devised, I believe, by Houdin, the famous conjuror, who applied it to the public trickery conjointly performed by his son and himself, and is described in his autobiography. All of the so-called second sight performances can be explained by intentional or unintentional trickery, by coincidences, or by exaltation of some of the senses, and usually, as in the case of the young lady referred to by Dr. McGraw, that of hearing. In regard to the other claims made by the friends of the young lady and by Mr. Fairfield, they must, like all similar claims of non-experts, however honest, or however able, be rejected at once; if they were true, as they are not, they could only be proved true by expert examination. In regard to all these and all similar claims, I may repeat what I have elsewhere stated—"when the wand of the expert touches them they vanish into air."

On ordinary and simple questions of medicine, or physiology, or surgery, the testimony of patients, however able, honest and scholarly, is, as we all agree, worth next to nothing; in this subtle branch of medicine and physiology it is worth less than nothing. Those who are

interested in the general subject of the physiology, pathology and trickery of delusions, would do well to keep in mind these propositions:

1. This subject can be successfully studied only by experts, and the experts must come from the medical profession, and from those who are profoundly and practically versed in the nervous system. Laymen can only become experts by first studying medicine.

2. Average human testimony on the subject is worth absolutely nothing. It may, however, as in the case of Mesmer, the Fox girls and Brown, have the effect to call the attention of experts to hitherto unnoticed or wrongly interpreted phenomena. *

3. Men of great general ability, and even scientific men of great fame in other departments, but who are non-experts in this, make worse blunders in studying these subjects than ignorant laborers.

The psychological explanations of this are interesting, but I have not here space or time to present them. The fact is illustrated by the history not alone of mind-reading, but of witchcraft, alchemy, animal magnetism, clairvoyance and spiritualism. The second committee of the French Acadmy, to report on animal magnetism, Dr. Elliotson in London, Hare in Philadelphia, and, more recently, Crookes, Wallace, Cox, Varley, Olcott, Owen, and some of the scientific professors of Yale, are well known illustrations.

4. Experiments in this department that do not allow for these six sources of error:

1. Intentional deception on the part of the subject.
2. Unintentional deception on the part of the subject.
3. Intentional collusion of bystanders, confederates, or of the operator.
4. Unintentional collusion of bystanders or of the operator.
5. Guess-work and coincidences.

* A striking illustration of the worthlessness of human testimony in these matters came under my notice only last week. A friend of mine, an aged clergyman, of thorough integrity and fairness, has for very many years—the larger part of his mature life, I believe—enjoyed the reputation of being especially skilled in the finding of places to dig wells, by means of a "divining rod" of witch-hazel, or the fresh branches of apple or other trees. His fame has spread far, and the accounts that are given by him and of him must be to those who think human testimony is worth anything, overwhelmingly convincing. He consented to allow me to experiment with him. I found that only a few moments were required to prove that his fancied gift was a delusion, and could be explained wholly by unconscious muscular motion, the result of expectancy and coincidence. In his own yard there was known to be a stream of water running a few feet below the surface through a small tube. Marching over and near this the rod continually pointed strongly downward and several times turned clear over. These places I marked, blindfolded him, marched him about until he knew not where he was, took him over the same ground over and over again, and although the rod went down a number of times, it did not once point to or near the places before indicated.

6. Phenomena of trance and of the involuntary life in health and disease.

Experiments that do not clearly and intelligently and systematically allow for errors from all these sources, can be of little or no value to science, however able or honest or famous the investigator may be.

As the members of our profession become experts in the study of these delusions, they will learn that there is about them no mystery whatever; that they can be explained and are explained by laws already known to experts and by trickery, and that there is no need of any hypothesis of odic force, or psychic force, or thought-reading, or mind-reading, or brain waves, or animal magnetism, or second sight, or any other refuge whatever.

In closing, I may express the hope and belief that this letter will be received in the spirit with which it is written. If I have criticised with somewhat of severity and absoluteness radical and vital errors, it is because the paper in which they are contained is one of the very few recently written on the subject that are worth criticising, and because I sympathize so fully with the feelings and general purpose that inspired it.

[*Detroit Review of Medicine and Pharmacy.*

PROF. LOOMIS ON THE STORMS OF THE UNITED STATES.

This eminent meteorologist presents, in the July number of the *American Journal of Science*, his third paper on Storms, founded on the weather-maps of the Signal-Service. He is now able to confirm what was stated in his previous papers in regard to the general progress, direction, and barometric phenomena of storms in the United States. These papers of Prof. Loomis are admirable in method, and of very great value. The general direction of the storms which traverse the United States is found to be a little north of east, but varies somewhat with the seasons. Thus, July storms are most southerly in their direction, being a little south of east, those of February being most northerly. Rarely, storms move for a time northward or southward.

By direction of a storm is meant the movement over the country of the whole storm, not the direction of the winds, and its progress varies greatly in rapidity. The average velocity during the past three years has been 26 miles per hour, the storms of August being slowest, those of February and March being most rapid. The storm of February 22,

1874, moved at the tremendous rate of 53.3 miles an hour, or 1,280 miles in a day.

It is also shown that the progress of storms is not uniform throughout the day, but has a uniform daily variation. The velocity is greatest by 25 per cent. from 4.35 P. M. to 11 P. M. than during other portions of the day, and this is constant during each month of the year. The greatest velocity occurs at about 7 P. M. without apparent reaction to the wind's velocity, or absolute temperature. "But," the Professor observes, "it is the time when the temperature of the day is declining most rapidly." Now, this change of temperature has direct relation to those conditions which cause precipitation and extend the rain-area. By reference to a former paper of Prof. Loomis, it will be seen that condensation in front of the storm-centre is one means by which a storm progresses. It is continually making up in its front, where the air is vapor-laden, not in its rear, where the air has been deprived of its vapor.

It will hardly admit of question that the velocity of a storm's forward motion is usually accompanied by an extension of the rain-area in the direction in which the storm progresses. The average extent of this area in front of the storm-centre during three years is found to be 542 miles. Now, if this be increased 100 miles, the velocity of the storm is also increased, and the reverse occurs when the area is diminished.

The general outline of a storm-area is an oval, the longest diameter of which is in direction of the storm's progress.

Around the centre of a storm are points or lines of equal barometric pressure, and the lines thus formed are called isobaric curves. These are, in shape, irregular oval, and the longer diameter may be, or may not be, in the direction of the storm's longer axis. The prevalent direction is a little north of northeast.

Prof. Loomis suggested in a former paper that intense and sudden cold arises from vertical movement or displacement of air, by which the warm air suddenly, in some cases almost instantly, rises, the cold air of the upper atmosphere displacing it by its descent. This conclusion is confirmed by recent observations. On the 15th of January, 1875, the thermometer at Denver indicated a fall of temperature of 48° in one hour, and, in another instance cited, the change was 36° in five minutes! It is significant that these sudden invasions of cold air appear first, as a rule, on the Rocky Mountains, or contiguous highlands. The presence of mountains seems to favor the development of cold, which would not be the case if the movement of the cold wave was an horizontal one from the Arctic regions, as formerly supposed.

NOTES.

The Monkey as a Dentist.

The picture from which the frontispiece is made was first exhibited by the artist Decamps in Paris, in 1842. It made a great sensation, and won almost universal approval. In the delineation of monkeys Decamps particularly excelled, and was immensely popular. All his pictures of monkeys were photographed by the artist, and criticised by T. Gautier and others of the period. Rich amateurs affected the theme and style of work. After Decamp's decease Prince Drundoff attended the sale of the artist's effects, and purchased one of the pictures, giving for it the sum of 26,000 francs.

Decamps first obtained publicity as a painter in 1830. At that time he had just made a long Oriental tour, and now on his return sent to the Salon a sketch which he fondly hoped would bring money and fame. The picture, however, was rejected by the committee, on the ground that it was unfit for public exhibition. Decamps was naturally indignant at this, and swore revenge. A year elapsed. Decamps sent to the Salon a picture representing a number of monkeys trying to appreciate a work of art. The meaning was transparent. On recognizing their caricatures so happily drawn, the committee laughed. Decamps was admitted to the Salon, and thenceforth his reputation was secure.

Decamps also made very clever caricatures of Charles X, but they were soon suppressed as too sharp, and the artist himself narrowly escaped prosecution.

How we Keep our Mouths Shut.

Donders asserts that the mouth is kept closed, not by the action of the muscles connected with the lower jaw, but by atmospheric pressure. He has investigated this phenomenon experimentally. By employing a manometer, communicating with the space between the tongue and the hard palate, he finds, when the mouth is kept shut, a negative pressure corresponding to from two to four millimetres of the mercurial column. There are two suctorial spaces in the mouth ; the principal one is bounded by the tongue below, the hard palate above, and the soft palate behind ; the other is situated between the tongue and the floor of the mouth. The former is used in sucking liquid through a straw ; the latter (sometimes) in smoking. Both are employed when we endeavor, with the mouth closed, to extract a foreign body from between the teeth. The mouth may be shut during sleep, when the muscles of mastication are relaxed. If a man fall asleep in the sitting posture with his mouth open, his jaw drops ; the tongue not being in contact with the hard palate, the suctorial space is obliterated ; the soft palate no longer adheres to the root of the tongue ; and, if respiration be carried on through the mouth, the muscular curtain begins to vibrate, and snoring is the result.

Popular Science Monthly.

Brooklyn Dental Society.

The eighth annual meeting of this Society was held on Monday evening, Oct. 11th, 1875.

The following officers were elected for the ensuing year :

President.......... WM. H. ATKINSON.
Vice-President.......A. H. BROCKWAY.
Rec. Secretary........C. P. CRANDELL.
Cor. Secretary........WM. FISHBOUGH.
Treasurer............F. W. DOLBEARE.
Librarian..................O. E. HILL.

C. P. CRANDELL,
Recording Secretary.

Springfield, Mass., Oct. 25, 1875.

Editor Dental Miscellany,

Sir: The thirteenth annual session of the Connecticut Valley Dental Society was held at Springfield, Mass., on the 21st and 22d inst.

The following officers were elected for the ensuing year, viz.:

President, Dr. H. F. Bishop, Worcester.

1st Vice-President, Dr. H. W. Clapp, Westfield, Mass.

2nd Vice-President, Dr. E. M. Goodrich, Westfield, Mass.

Secretary, Dr. C. T. Stockwell, Springfield, Mass.

Treasurer, Dr. N. Morgan, Springfield, Mass.

Executive Committee.—L. C. Taylor, Hartford; H. F. Bishop, Worcester; L. Noble, Springfield.

Very Truly, &c.,

C. T. Stockwell, *Secretary.*

New Process of Embalming.

The author (*Ann. Sc. ed. Industr., IX, Milan*) has found that carbolic acid, combined with camphor, is excellent for the preservation of anatomical specimens. He prepares the mixture by bringing crystals of carbolic acid in contact with pieces of gum camphor. The crystals unite and form a substance resembling oil. He dissolves the whole in a sufficient quantity of petroleum, previously colored with cinnabar, in the following proportions: two hundred grammes of petroleum, seventy grammes of carbolic acid and camphor; or better, one hundred and thirty grammes of camphor and carbolic acid, and one thousand grammes of petroleum. The mixture may serve as well for injections as for the immersion of pieces that are to be preserved. The pieces harden, but become soft and flexible when they are plunged into warm water. This mixture is not dangerous, and does not injure or stain the instruments.

A Heavy Rain.

What a heavy rain really means in avoirdupois weight is well illustrated by some statistics given by Mr. Symons in his recent report on "The Rainfall of Great Britain for the year 1874." The rain of October 6th was the most important which occurred during the year, and has probably had no equal since July 6, 1872. At about 80 stations the fall exceeded 2 inches; at 28, 3 inches; at 4, 4 inches; and at 2, 5 inches. The heaviest rain, from 2 inches to 5 inches and more, was pretty well confined to the western part of England; parts of Cumberland, Westmoreland, and North Wales having had falls of 5 inches. In connection with this widely-distributed and in some places heavy fall, Mr. Symons has given an interesting calculation of the whole weight of water precipitated on this day, which he reckons at 3,797,000,000 tons. He adds:

"It is rather a curious, although purely fortuitous circumstance, that this grand total of nearly 4,000,000,000 tons should be almost exactly equal to a uniform fall of 1 inch over the whole of England and Wales. There is another aspect of the question which has not yet received adequate study: How much air has been deprived of its vapor to provide this uniform deposit of one inch of rain? A cubic inch of water contains 252 grains. Taking the temperature of the air at 55°, a cubic foot can contain only five grains; and as the air was certainly not deprived of half its moisture, even allowing for change of temperature, each cubic foot could have yielded at the most only three grains. But there are 1,728 cubic inches in a cubic foot, and therefore each cubic inch could have given only one five hundred and seventy-sixth (say one six hundreth) of a grain. As the inch of rain requires 252 grains, we have the result, $252 \times 600 = 151,200$ vertical inches, or 12,600 feet, or rather more than two

miles high of air must have been dried to have yielded the water deposited."—*Boston Journal of Chemistry.*

Mica.

Next to asbestos, mica is the most remarkable of mineral substances. The peculiar physical nature of both is the result of a crystalline tendency, which for the asbestos manifests itself in fibrous filaments, while in mica it causes the formation of thin plates or layers—so thin, indeed, as to be often equal to that of the envelope of a soap-bubble, as proved by comparison of the play of color in both, a phenomenon by which the length and velocity of the luminous waves of different colors have been determined.

The old name for mica was "Muscovy glass," as it was first introduced into Europe by Russia. It is also called glimmer, and in the form of small scales forms one of the three constituents of granite, the other two being quartz and felspar.

The history of its early uses is unknown, but, singularly enough, the New World shows the remnants of the most ancient and extensive mica mines in the world. They were operated in North Carolina by an extinct race preceding the Indians, in ledges of coarse granite, full of pockets with mica, of which the number and size are remarkable, some of the open cuts being one hundred feet in diameter, and thirty feet deep. Tunnels of considerable depth also exist, showing the distinct marks of the chisels against the granite walls; but the tunnels are all of such very small size that they suggest forcibly the idea that the race working in them were considerably smaller in size than the present human beings, who surely could not work in such low tunnels.

Few minerals are more interesting to the speculative philosopher than mica, either when he considers its true chemical composition, its form and mode of lamellar crystallization, or its peculiar behavior under the influence of polarized light. It is, indeed, one of the most precious treasures in nature's storehouse, which has only to be better known to be appreciated.
Manufacturer & Builder.

Sea-Sickness Cured by Nitrite of Amyl.

Dr. Clapham (*Western Lancet*), says that nitrite of amyl is almost an infallible cure for sea-sickness. He exhibits three drops of nitrite after the first vomiting.

A New Emerald Green.

Any pigment which approaches in beauty the fearfully poisonous Paris green certainly deserves attention. One of these is said to be an hydrated oxide of chromium, prepared in a peculiar manner, and known as Guignet's green. We doubt the statement that it is not poisonous; but it is, at all events, far more harmless than Paris green, or any other arsenical color. It is prepared on a large scale by fusing together on the hearth of a suitably constructed flame furnace, at a dark red heat, three parts boracic acid to one part bichromate of potash. The mass swells up, much oxygen gas is evolved, and the substance is finally converted into a beautiful green double salt, a borate of chromium and potash. By repeated washing with boiling water, it is decomposed with hydrated oxide of chromium and a soluble borate of potash. After suitable washing and very fine grinding, this oxide of chromium has a most beautiful shade of color, covers well, stands the air and light, and is only attacked by boiling concentrated acids. On a small scale, this green pigment may be prepared in a porcelain crucible.—*Scientific American.*

A London dentist's circular says that, as a general thing, only men of culture go into the tooth-drawing profession. And yet it must be admitted that many of them are not men of gentle extraction.

JOHNSTONS'

Dental Miscellany.

Vol. II.——*DECEMBER, 1875.*——No. 24.

THE STATUS OF DENTISTRY.

Abstract of remarks in reply to an article in the British Medical Journal. By J. Smith Turner, M.R.C.S.

You may perceive, gentlemen, a fallacy running through the whole of this article. Druggists and Dentists are supposed to be followers of the professions which are "half trades." How far druggists claim to be professional men I am unable to say. I know dentists claim a professional status, and I think deserve it, although unfortunately there are many men calling themselves dentists who do their best to destroy dentistry as an educated calling, and I hesitate not to say that an article such as that I have just read to you adds to the difficulties of those who are seeking to maintain the dignity of the profession. Plainly I see no analogy between a druggist and a dentist. The highest function of a druggist is to compound drugs as ordered by the medical practitioners. To this he may add the useful office of supplying sundry articles required by the public for domestic or manufacturing purposes, and which his business as a Pharmaceutist makes it convenient for him to keep, but many such articles may be had in establishments of quite a different character, inasmuch as no particular education is required for dealing in them. Hence, druggists keep shops because they have something to sell, and it is convenient to sell such things over a counter, as is the fashion in shops. Now, I cannot see that by looking at this picture in any way we can trace the shadow of a dentist's occupation, unless it be that in the motley mixture of drugs and elixirs, sponges and wax vestas, complaisters and dog-soap, we may find tooth brushes and tooth powder. Indeed, the only likeness the writer can see is in the assumption which

he makes that as some druggists must sell at the smallest profits so some dentists must "sell" the cheapest possible sets of mineral teeth, and trust to a large business and quick returns in order that the poorer classes may get the advantage of artificial dentures. The writer then asks the fair question which might have been asked without instituting any comparisons. "How are all these to be brought within the range of professional ethics?" As the writer does not stop here we must delay answering him until we follow his next sentence, in which he exclaims, "To be told they must not advertise, must not attract by a show-case, or by well-made teeth marked at a cheap price in a shop window! Why should not dentists advertise as well as druggists? Teeth ought to be stopped cheaply, made well, and sold cheaply," and so on.

In all this ancient form of dogmatism, which even the inspiration of the *B. M. J.* cannot galvanize into the semblance of anything new, we quite agree. Teeth should be stopped cheaply and made cheaply, and we may add, extracted cheaply. We also know that such is the case, and if the writer will but study the literature he so much admires, or look into the windows of his professional friends the druggists, he may find that he can have his teeth stopped or extracted for sixpence each and upwards, and if that be too much he may have them attended to for nothing if he go to the right places. If he continue his investigations he will find that he can have the most perfect artificial teeth ever made, for a sum far below the price of the labor which is put upon the most ordinary dental work by the respectable practitioner, apart from any concurrent expenses. Surely philanthropy and enterprise can go no further than this. But when the writer asks why may not the dentist advertise as well as the druggist, he shows a willingness to be instructed, and we will, with all due modesty, proceed to enlighten him.

I presume that a dentist may wish to conduct his so-called business in a professional manner—that is one reason why he may not advertise. Then we must ask what has a dentist to advertise? Is there anything he can say in an advertisement which may not be a lie from beginning to end so far as the public is able to judge? If he lay claim to superiority over other dentists he is simply a pretentious humbug appealing to a public utterly unqualified to form an opinion. If he pretend to cheapness, he is only misleading people. There are hundreds of respectable men who are willing to give their services on the lowest possible scale of remuneration, but who do not go to the expense of advertising, knowing well that it must be paid for by their clients, and that their profits do not leave a margin for such extravagances. As to the

exhibition of well-made teeth in shop windows. I do not know what the writer may mean by well-made teeth, but when a man of education, and we must suppose of professional feeling, uses such expressions towards the show pieces seen in shop windows and in boxes, we can hardly be surprised that uneducated people are led away by appearances. In what way well made? I ask. If the highest modelary skill and the best mechanical ingenuity were combined in making such cases, would that constitute one of them an article of utility to any one of the thousands who may gaze in ignorance at the well-made imitations of nature? I say the dentist may not exhibit show-cases, because they are a delusion and a snare. They are baits for the ignorant, and may be bought and exhibited by men who could no more reproduce them than they could fly. To the question, "How are all these (meaning the cheap dentists) to be brought within the range of professional ethics?" we will make answer further on. The article on which I have been commenting was replied to by Mr. Hamilton Cartwright, whose gentlemanly letter called forth a rejoinder containing none of the offensive matter of the first article, and which we will endeavor to meet with the same honesty and candor that characterizes it throughout. The gist of the second article is that the union of surgical with what has been for convenience called mechanical dentistry is incompatible with, first, a purely professional occupation, and second, with such fees as are to place artificial teeth within the reach of the lower or poorer classes. Now it appears to me that the trade element urged in this article need not exist. The position is simple. A person requires, under advice, a set of teeth, a certain fee is asked, in return for which the dentist gives his trained skill in adjusting the apparatus or "instrument," as the writer calls it. But in this transaction there is no question of material or method, and any practitioner imbued with a professional spirit would at once stop any approach to buying or selling teeth or materials. Teeth and gold and other things can be bought and sold, so can oil, paint and canvas, but they must pass through other hands and receive the impress of skill and genius, before they arrive at their highest state of usefulness or beauty. The truth is that the Dental Surgeon holds himself responsible for the instrument which he recommends, and thus saves his patient in pain and in pocket. If surgeons followed their example, even in a small degree, we might see less of the anomaly of spinal curvature being treated by a civil engineer, and children and young people being expected to walk and grow and thrive, while carrying about with them the weight of a soldier's knapsack, under the name

of surgical appliances. Heaven save the mark and pity the patients! The dentist, I am inclined to think, is a step in advance of the surgeon in this respect. He superintends the preparation of the instrument he wishes applied, either for the regulation or substitution of natural teeth, he adjusts it and modifies it to suit all circumstances. It may be impossible for the surgeon to pursue this course in every particular, but that does not prove that it is undesirable or unprofessional in the dentist who can do so to follow it out. In the matter of cheapness there will always be the element of personal services to stand in the way of that moderation in the price of good work which is desirable. Unlike the majority of surgical appliances, cases of artificial teeth cannot be kept in stock nor yet in an approximate state of preparation. Every case must be treated on its own individual merits from beginning to end. This alone will prevent anything being done on a large scale with a due regard to rigid economy and soundness. Economy is an individual virtue, and is as likely to be exercised in a small as in a large scale of operations. As to soundness of work, that is not usually the characteristic of work done on a large scale. But the "large scale" is in itself a misconception. The trained mechanic has a different case to manage in every artificial frame he may make, and so the rule of thumb principle applicable to things made on a large scale does not exist even in the dentistry of the future. If a dentist have a good mechanical training his knowledge will be applied much more advantageously if it be backed by a surgical education which teaches him to look below the surface of things, and to recognize much more than the mechanical expert ever can do when he looks into a patient's mouth; but if he have not this mechanical training he will certainly fall into most grievous mistakes. There is not, I believe, a member of our profession educated beyond his mechanical duties who would not bear me out in this assertion.

Neither the writer in the *B. M. J.*, nor any of us, can get away from the fact that we have living and sentient tissue to deal with, that this tissue and its surroundings are frequently the seat of morbid disease which may be lighted up at any moment by the unskillful dentist. This, and the amount of pain which may be inflicted upon unsuspecting patients, must be perfectly well known to the writer of the article in the *B. M. J.*

But I would ask, Where is the line to be drawn? How about the delicate but useful operation of grafting or pivoting teeth? Is the patient to have one-half of the operation performed by one man, and

the rest completed by another? Again, how is the regulation of teeth to be carried on if the two branches of our profession are to be separated? Perhaps some method might be devised, but at present I cannot see my way through the difficulty. Neither can I believe that the difficult task of adapting obturators for defective palates can be carried on to perfection by men who have not been surgically educated, however skillful they may be as mechanics. Then there is the convenience of the patient. The wearing of artificial teeth is a delicate matter, and secrecy is frequently an object with patients. How far this desire is to be consulted, or how far delicacy of feeling is to be met by sending people from one man to another, are questions I must leave to those who suggest the change. Now to the question about bringing the dentists under the range of professional ethics. My answer is, give them a professional education. There will ever be in dentistry, as in surgery, degrees of degrees, and that professional principles are desirable, nay, essential in every degree, I am fully convinced. I do not for a moment suppose that in the event of dentistry acquiring a defined legal position in the community, there would not be those who would profess to serve the public as tooth-makers or tooth-fitters, but they would be known for what they might be, even as herbalists and bone-setters are distinguished from physicians and surgeons. While there is a demand for such people they are sure to arise. Neither would any sane person attempt to arrest in his career the industrious mechanical assistant who may supplement his salary by attending to the wants of his friends. Apart from the legal impossibility, I would deprecate such a step for the reason that I believe that the man who has some acquaintance with the mouth beyond that afforded by models in the work-room, always gives the best work, and is more ready to see his way through a difficulty. But because tooth-makers will exist, and because the latter class of workmen are useful, that is no reason for the public being deprived of a higher class of service by the arbitrary splitting up of the profession. And because there are mechanical phases in the profession of dentistry I cannot see that they are incompatible with the highest professional spirit. I do not think there is much of a pecuniary aspect in the desire which we have to possess a defined social position. Whatever legal position we may attain, the situation will be much the same as now, so far as mechanical dentistry in its limited aspect is concerned, and for my own part I do not think it a disadvantage to the profession that it should be so. But I do think it unfair that any one should have the power to call himself a dentist or surgeon-dentist or dental surgeon

according to his fancy. The man who has spent years of his time and much money in qualifying himself to practice his profession honorably, and who offers a diploma to the public as a guarantee to that effect, can only assume the same title. We ask a remedy for this. Not protection for any privilege, but a remedy for a grievous wrong. The professional position of the dentist requires legal definition, and the pecuniary and sanitary interests of the public require protection.

[From the Popular Science Monthly.]

A HOME-MADE MICROSCOPE.

By John Michels.

The progress of science in recent times is in a great degree due to the employment of instrumental aids to observation; and whoever wishes to keep up with this advance, or indeed to gain an adequate notion of its extent and interest, can only do so by the use of similar means. In the study of chemistry, experiments and actual observation of the behavior of substances under various conditions are indispensable; in physics, multifarious appliances for the illustration of principles are constantly required; in astronomy, the telescope is absolutely essential; and, in biology, vast departments can be brought within our reach only by the aid of the microscope. This latter instrument, especially, has a wide range of application. The investigations of the anatomist and physiologist cannot go on without it; the educated physician has it in daily use; the tradesman finds it an important aid in testing the purity of commodities; and the student in many departments of physical science is obliged to use it in his work. When to all these considerations we add that the manipulation of the microscope, for the purpose of ordinary observation, may be acquired without much difficulty, and that the instrument itself may be procured at a moderate cost, we have said enough to justify the assertion that every educated person ought to possess a microscope, even as he possesses a collection of books.

To derive advantage from the use of the microscope, it is not necessary that one should master all the technicalities of the instrument, or be possessed of all the improved appliances for extremely minute observations. Professional microscopists have recognized the error of directing all one's efforts on such tasks as the resolution of test-plates, so long as

really urgent work remains undone. Thus, the President of the "Quekett Microscopical Society" remarked :

"Our opticians have gone ahead of the observers, they have placed in our hands powerful means of research. I fear the account of the talent committed to our charge will not be one of which we may be proud. I fear we are too apt to pride ourselves as being the possessors of superior instruments ; each man pits his instrument in rivalry against his neighbor's, and rejoices that he can beat him in the resolution of Nobert's test-plate."

Mr. Le Neeve Forster, in the above remarks, doubtless strikes at the

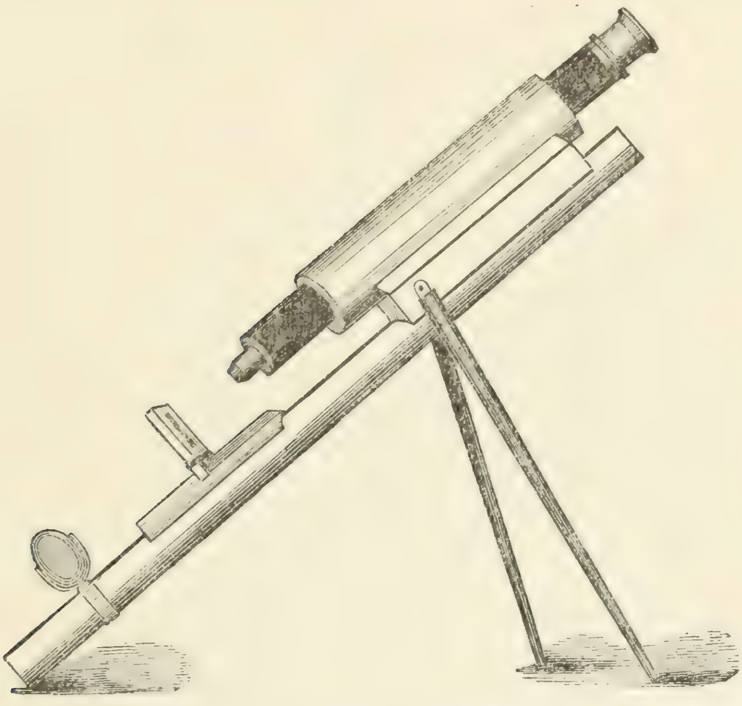

FIG. 1.—COMPLETE INSTRUMENT.

root of an evil that is fast becoming a nuisance, to the utter detriment of useful and sound work ; the test-slide and diatom fever has spread like an infection among all classes of microscopists, and has resulted in an extravagant system of expenditure foreign to true scientific research. I find that $1,650 is now asked for a first-class instrument and fittings, and as much as $40 apiece for diatom-slides.

These eccentricities of leading microscopists appear to have received protests from various quarters, for the President of the Royal Microscopical Society, in his last address, states :

"It has been cast at us, as Fellows of this Society, that we do nothing but improve our tools, or measure the markings on the frustules of a diatom." *

One reason for the confessed poverty of microscopical results may be ascribed to the want of sufficient workers to cover so vast a field of research. It is to be regretted that many professional men, whose occupation would seem to demand the daily use of the microscope, deny themselves the facilities it offers. I apprehend that the explanation of this apparent neglect will be found in the high price asked for first-class instruments, and the absence in the market of a good standard instrument that combines the advantages of being of the best workmanship, full-sized, portable in form, and moderate in price.

Messrs. Baker, Crouch, Collins, and especially Swift, all of London, produce such microscopes, but, as their importation doubles the cost, their chief merit of cheapness is lost. In our own country, opticians have proved that they can produce work that cannot be surpassed, provided that their patrons entertain the same views as Sir Charles Surface respecting the expense; but those of more moderate means who wish to purchase a good working microscope at a moderate cost, are offered a pretentious display of foreign and domestic forms, totally unfit for professional or scientific use. If makers of microscopes would take a lesson from the best telescope-makers, and, instead of multiplying the number of their models, combine their energy in the production of a good standard instrument, filling the conditions that I have already stated, they would promote the cause of science and concentrate their business.

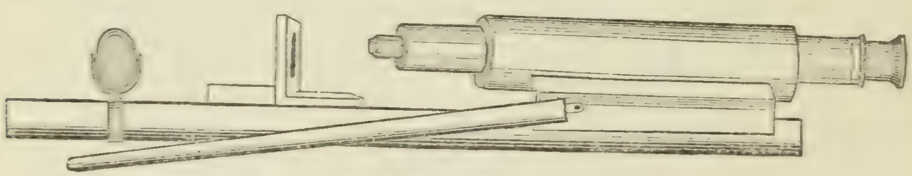

FIG. 2.—INSTRUMENT FOLDED FOR CARRIAGE.

Those who have read the biographical and obituary sketches of eminent microscopists have probably noticed that it was a favorite pursuit with many of them to make their own instruments. In the *Monthly Microscopical Journal*, for March last, will be found such a notice included in the address of the President of the Royal Microscopical Society, referring to the death of a Fellow, Mr. John Williams, who was also Assistant Secretary of the Royal Astronomical Society. He said:

* February 3, 1875.

"He constructed more than one microscope out of odds and ends, which he put together with much skill and ingenuity. His most elaborate microscope was made with cardboard tubes and brass-screw adjustments. This instrument, when supplied with objectives by Ross and others, contrasted favorably, in point of utility, with constructions of a more costly character."

The perusal of this notice, followed by a communication to the effect that in some of the London scientific schools the students are required (when practicable) to make all the apparatus they use, has prompted me to describe a microscope made by myself about six years ago, and which is now but little the worse for wear.

So far as the stand is concerned, it can be easily made at home, at a trifling cost. The materials are of a humble character, but the optical arrangements are full-sized, and of the highest quality. Within the limits of its use this instrument will exhibit objects with much perfection. By a reference to the cuts, it will be observed that many of the parts are cylindrical, and may be turned on any ordinary lathe in a few minutes.

To make a microscope such as I shall now describe, requires little mechanical skill. If my directions are followed, and strict attention given to the drawings, no difficulty will be encountered, but neatness and precision are of course essential. First provide a wood rod about 15 inches long, and of the circumference of Fig. 3.

Fig. 3.

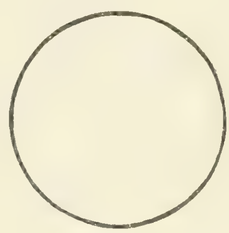

Fig. 4.

Then take some paper of firm texture, and wind it around the rod three or four times according to its thickness, applying mucilage all the time; immediately withdraw the paper casing, and place on one side to dry. This should form a perfectly true and firm tube. When dry, replace it on the rod, and with a sharp knife cut off from each end sufficient to leave the remainder 7½ inches long.

The other parts are of wood. I suggest mahogany as the most ap-

propriate, and susceptible of the best finish: but any well-seasoned hard wood will do.

To proceed, make a rod, like an ordinary ruler, 13½ inches long, and of the diameter of Fig. 4. Now turn, or get turned, a tube 4½ inches long, the walls of which shall be ¼ of an inch thick; Fig. 5 will give the diameter.

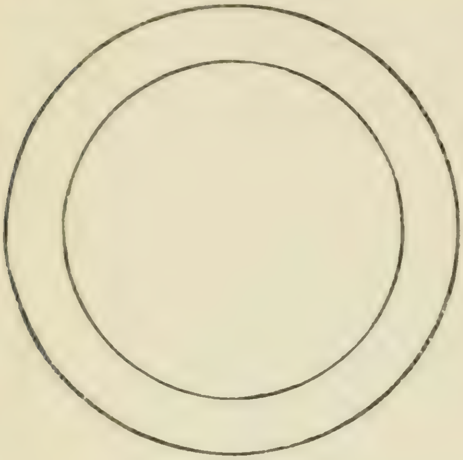

Fig. 5.

Fig. 6.

A part which I call the cradle can now be made; the form is shown in section, at Fig. 6; its length must be 3¾ inches.

The support for the stage requires no special explanation; a full-sized drawing is given at Fig. 7.

The stage itself can be made of wood, but gutta percha is better, and,

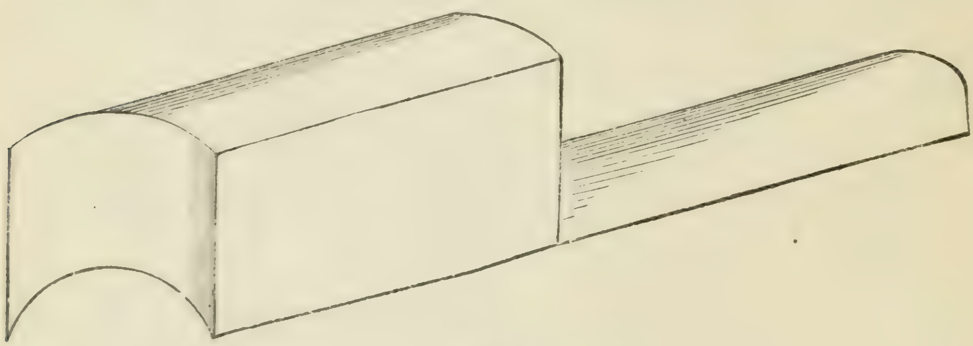

Fig. 7.

if placed in hot water, it can afterward be easily moulded to the pattern given at Fig. 9.

Smooth the surface while still warm with glass plates, and steady the back with two strips of wood. The shaded part at the lower edge shows a piece of wood fixed thereon to support a zoöphite trough or

glass-slides. Fig. 10 represents the upper and lower parts of a leg, two of which are required 9¾ inches long, and the size shown in cut. On the upper portion the brass hinged attachment is fixed.

The appearance of the paper tube, with eye-piece and object-glass in position, can be seen at Fig. 11.

The parts which have been already described being completed, proceed to fix them together with glue. Their correct position can be seen at a glance by reference to Fig. 12.

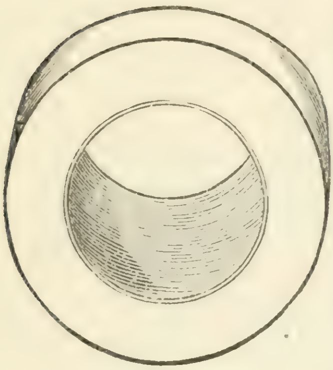

Fig 8.

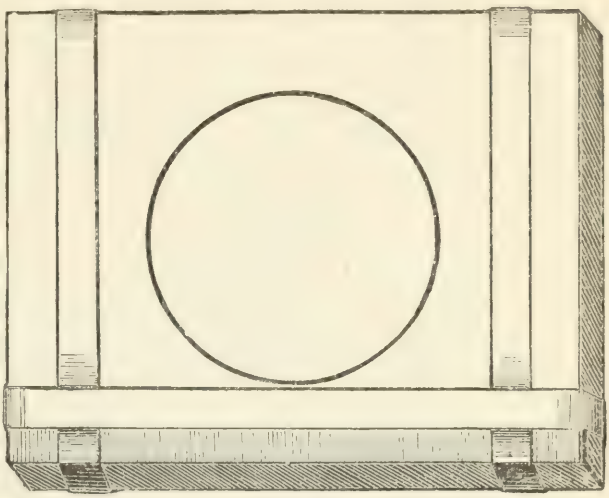

Fig. 9.

First fix the cradle, 6, upon the rod, 4—within three-quarters of an inch of the end—next the tube, 5, upon the cradle, as shown. The stage and support can next be fastened, but first insert the paper tube, Fig. 11, in wooden tube, 5, and measure the most convenient place to

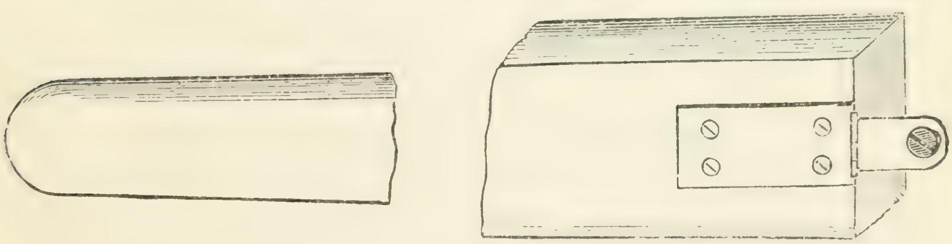

Fig. 10.

fix the stage, so that the object-glass can approach the object without bringing the tube too low down. A trial will at once fix the proper spot.

The legs are attached by screws to the cradle, as seen in Figs. 1 and 2. The whole being now in form, clean and French-polish. Also

paint the inside of the paper tube a dull black, using drop-black, turpentine, and a little Japan varnish to fix color, and the outside with a mixture of Indian and common inks. Finally, line tube, 5, with a

FIG. 11.

piece of fine cloth. If this is neatly done, the paper tube, Fig. 11, will pass and repass as smoothly as the motion of a telescope, which is controlled in a similar manner.

There is no reason why the optical parts should not be made by the student, but neccessary instructions would require a series of articles. Assuming, therefore, that such portions will be purchased, a few words on that head may be necessary.

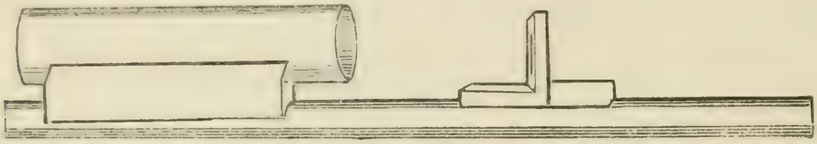

FIG. 12.

If only one eye-piece is required, select letter B. Next take tube, Fig. 11, to an optician, and ask him to fit a Royal Microscopical Society screw, Fig. 8, in the centre of a wood block. This block and screw must be fastened into one end of the paper tube, and will cary the object-glass.

The last fitting will be the mirror, a reduced drawing of which is shown at Fig. 13.

The mirror should be at least two inches in diameter, and the ring which passes over the rod, Fig. 4, should be split, and about half an inch in breadth, and, being made somewhat too small, will grip the rod, and be free from unsteady movement.

To hold the slide upon the stage in position, pass two moderate-sized India-rubber bands upon each side, and a third crosswise near the bottom ; a very delicate movement can be given to a slide thus held.

In regard to object-glasses I have little to add. Such as I should have specially recommended are not to be obtained in this country ; but, to commence operations with, purchase the best 1-inch and ½-inch your means will permit.* I much regret that the objectives made

*Since the above appeared, Mr. James Colegrove, of Indiana, has written to say that Mr. Gundlach has for the past two years resided in Jersey City. I find this statement correct, and that an inch objective can be obtained for $8, and a half-inch for $10.—J. M.

by Gundlach, of Berlin, are not introduced. It would be a boon to those who cannot afford to purchase the best glasses. I have seen them tested at the Royal Microscopical Society with the most costly objectives, where their performance has elicited the highest praise. When I state that an immersion $\frac{1}{16}$ costs in London but £3 10*s.*, the price of the low powers can be calculated.

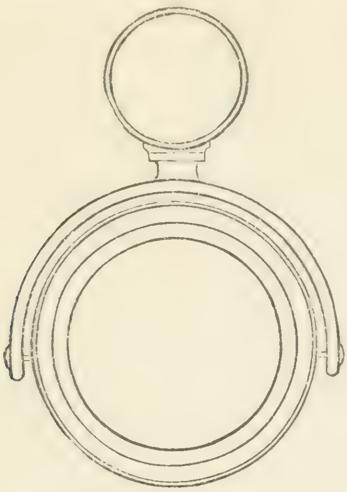

FIG. 13.

These $\frac{1}{16}$ths have wonderful definition, and can be used upon all slides, having the ordinary thin glass cover, a great advantage. Such a glass could be sold here for thirty dollars, and the 1-inch and ½-inch for about ten dollars apiece. Except for special work, these objectives answer every purpose. The sketch at Fig. 1 is a correct drawing of the complete instrument, in position for use ; and at Fig. 2, the same folded, showing its convenience and portability. The whole weighs about a pound, and can be carried, with eye-piece and object-glass ready for use, either in a bag or a light box 14 by 3½ by 3 inches.

Those who possess very large instruments will find this model a most useful addition for occasional use when traveling or demonstrating subjects away from home.

This form of microscope is offered as convenient for beginners, who, unable to purchase a complete instrument, still wish to make a beginning and start upon a right principle. Although a complete microscope can be purchased for about the same amount that the optical portions of this will cost, it will be wanting in the chief essentials of a good working instrument. Diminutive size, smallness of field, poor light, shortness of tube, absence of Society's screw, and other evils, will

soon cause it to be cast aside, resulting in the loss of the original outlay; whereas the parts purchased under the above directions are portions of a first-class instrument, obtained in advance, which will never become obsolete.

The immense field of inquiry within the grasp of the microscopist is apt to disconcert and confuse the student. His course, however, should be well defined. First let him familiarize himself with what has been done by others, and then confine his attention strictly to those subjects which have reference to his profession or pursuit. If he has no special occupation, I would advise him to select a particular line of study, and let that be the thread on which to string his subsidiary matter, mounting his own objects, and carefully registering his observations. He will thus slowly but surely accumulate knowledge that will benefit the cause of science.

DISCUSSIONS OF THE AMERICAN DENTAL SOCIETY OF EUROPE.

Hamburg, near Frankfort, August, 1875.

Reported by Dr. C. M. Wright.

SALIVARY CALCULUS AND DISEASES RESULTING FROM IT.

Essay by Dr. Fay, of Brussels.

Dr. Eastlacke (Berlin) thinks there is no objection to the daily use of a gritty tooth powder. During his long residence in Japan noticed the action of Japanese tooth powders, which mostly contain very hard and gritty substances, and found no injurious effects, such as might have been expected; thinks these powders very good. The common kinds of Japanese powders contain pulverized pumice. The better kinds having instead coral, cuttle-fish bone, &c. The Japanese are extremely clean in their personal habits, and in some sections the natives perform the operation of cleaning the teeth every morning as a religious ceremony. In some sections again, salivary calculus may be found on the teeth of the Japanese. Physicians of Canton, who have studied this question in that country, believe that the lime in the rice eaten by the people of these particular sections of country, is the cause of this deposit. The Chinese who eat grapes and who do not live in the rice region do not suffer from this disease.

Dr. Cohen (Copenhagen) has found the deposit of tartar varying ac-

cording to locality, and where lime abounds in the water thinks the deposit will be more generally found.

Dr. Terry (Zurich) has observed that persons who live largely on fruits are not so liable to the affections of tartar, and thinks the fruit diet would be of advantage to individuals who are troubled with an excessive deposit of calculus.

Dr. Field (London): The operation for removing salivary calculus and cleaning the teeth is one greatly neglected, perhaps the most neglected of any of our important operations. It is a very important operation. It warrants great care from its importance, from the number of teeth lost, and from the disagreeable diseases resulting from its neglect. Great care should be given to the selection of fine and appropriate instruments for its removal. Thinks we should always require two or three sittings. At the first our fine scalers should be used, and all that we can remove of the deposit should be removed. Uses at this sitting aromatic sulphuric acid also, and creasote to assist in the formation of new granulations of gum. At the second sitting would go over carefully with the same treatment, and perhaps apply iodine where the gums are spongy and congested. Before we attempt to fill the teeth we should get the mouth into a healthy condition—a clean condition. This is our first duty—after that we may look to the teeth. Many fine operations on the teeth fail in a short time from this lack, and from want of this care on the part of *dentist and patient.* Finds the fine Howe's scalers the best he has tried.

Dr. McDowell (Frankfort): There are a variety of diseases of the gums that are very common too, many of them depending or resulting from calcareous deposits—ordinary ulitis, fungus, fungus hæmatodes. For these cases thinks the radical cure is to excise the diseased portions, and apply aromatic sulphuric acid. Has found this remedy a very superior one, and has not the confidence many have in the nitrate of silver. In the use of sulphuric acid does not inject, but applies carefully with a small broach with cotton. Has found no ill results to the tooth substance from the use of this remedy.

Dr. Field: In cases where a pocket is formed between the teeth, makes an incision or slit, and uses a stick dipped in the acid to apply it. Thinks the cause is not always a deposit of tartar first, but a lack of vitality in the teeth. The tartar follows. The lack of congeniality between the alveolus and the tooth, the low degree of vitality, causes the deposit of tartar; for the disease occurs in certain temperaments, and about some dense teeth lacking proper vitality.

Dr. Williams (Geneva): We have cases where the alveolus is so destroyed that only extraction seems to be indicated. Would inquire if this alveolus is destroyed only from deposit of tartar, or if perfect cleanliness would prevent the disease. Finds teeth in Geneva with scarcely any deposit about them of tartar, and yet an absorption of the alveolus has taken place, the teeth are loose, and a purulent discharge exudes about the necks.

Dr. McDowell thinks cleanliness will prevent this disease, though secession of the gums may appear.

Dr. Jenkins (Dresden): The question often arises, whether constitutional treatment in these cases of low vitality and uncongeniality between the teeth and surrounding parts will help. Will phosphates, &c., assist in reducing these diseases or in restoring the tone of the teeth, thereby assisting in the prevention of these diseases? Has himself great reliance on the mechanical treatment, and the after topical and mechanical treatment of cleanliness.

Dr. McDowell spoke of alveolus abscesses—has had considerable experience in the treatment of well developed alveolus abscesses. In these cases he goes back first to the former dental operations. If they have been thoroughly done, roots well filled, &c., effects an opening through the integuments and applies the sovereign remedy, the radical remedy—aromatic sulphuric acid. Described method of applying this remedy. Has had great success even in old and bad cases—but where the connecting vitality of the tooth and alveolus is too slight, prefers extraction of the tooth.

Dr. Dumont exhibited some fine specimens of the deposit of tartar. In one case a dens sapientiæ was fully enveloped in a ragged and fantastic cap of tartar, completely covering roots and nearly the whole of the crown.

ON THE EXTRACTION OF SIX-YEAR MOLARS AND REGULATING TEETH.

Essay by Dr. Abbot, of Berlin.

Paper by Dr. Paebsch, of Berlin.

Essay by Dr. Fay, of Brussels.

Dr. Jenkins (Dresden) uses the tin and gold filling for these teeth. After much doubt about the combination, was induced to try it about eight years ago and has been much pleased with the result. Lays a sheet of No. 4 gold on a sheet of tin foil, leaving the gold outside, and prepares this in cylinders, ropes or strips. This works in a soft and effective manner, under lateral pressure, to the walls of these teeth when they

are soft and delicate, and has proved itself a very valuable remedy in these cases. Prefers to save these teeth.

Dr. Eastlacke (Berlin) saves these six-year molars when possible. Formerly always employed gold. Has tried the tin and gold preparation, and is pleased with the results when the teeth are of the soft and chalky composition.

Dr. Field (London) believes in preserving these teeth, and is not in favor of extraction unless too long neglect has made it necessary ; but at the age when they are mostly affected by caries, these teeth are often not of good quality, are vascular and imperfectly formed or not complete ; therefore, fills them with temporary stoppings, &c. Thinks the loss of these teeth causes the second molars to tip forward, and their usefulness is often affected.

Dr. Dumont (Berlin): When the crowns are decayed away, or very considerably decayed at an early age, prefers extraction of these teeth. Mentioned a case where the four six-year molars were decayed, and he extracted the upper and lower teeth on one side. The patient left, and, after two or three years, having the opportunity of seeing him again, found that the biscuspids on the side of the mouth where the molars had been left had considerably decayed, while those on the other, where the teeth had been extracted, were perfect.

Dr. McDowell (Frankfort) spoke at some length of the Coffin method of expanding the arch in the regulating cases—has used this method very successfully for some time. It consists of an S-shaped spring made of English steel or piano wire steel, and vulcanized into the plate in the proper position. After finishing, the plate is sawed in two and the case adjusted in the mouth. Has seen the two halves of the mouth move independently after a few weeks of this pressure, and room enough is gained for the regulating of any of the teeth. Allows the plate to extend over the biscuspids and molars.

Dr. Field, of London, has had opportunities in Dr. Coffins' practice to judge of the efficiency of this method, and endorses it fully.

Dr. Williams has used it with success in the case of a lower arch which he wished to expand.

ARTIFICIAL DENTISTRY AND IMPRESSIONS.

Paper by Dr. Cohen, of Copenhagen, describing a method of taking impressions. The casts and models were exhibited.

Dr. McDowell pursues a similar method of taking impressions. It

is to get an impression in anything and take a model of the mouth, then mould an impression cup from this and take the true impression of the mouth in gutta percha. A thin coating of gutta percha being all that is required.

Dr. Norman Kingsley said that he felt, while listening to the paper and the remarks of the gentleman about impressions, that he was carried back twenty-five years, and was listening to the questions then discussed and the methods then explained. With all respect to the speakers he would ask *why* all this trouble, when, with perhaps half a dozen good impression trays in his laboratory and some plaster of paris, he could take nearly all the impressions that would be ordinarily presented in practice. Put the plaster in the cup and put the cup in the right place in the mouth and you have the true impression without any further ado. In speaking of articulation he said: If a *perfect* impression of a perfectly natural set of teeth could be taken, we would see how beautifully perfect a thing articulation is, inside and outside. The sutures and surfaces interlock and articulate and cog-wheel together. This should be our model for an articulation. Every piece belongs to its opposite. You may break up these models and can put them exactly back in place, in the place each piece belongs, because of this perfect articulation. This should be Nature's rule for us in our work. The rest of the work may be well done. The finishing, the fit, and all may be fine, but ask a patient who has worn one set that *articulates*, and he can tell you the difference. Then spoke of the advantages of celluloid ; does not put his name under it at all, but from the color, from the specific gravity, from the artistic capabilities, thinks it is worthy of a trial and the use of the profession.

Dr. Wright (Basel) said that he could endorse a material that had all these qualities. Stated that in 1867, before the American Dental Association, a paper by him was read on "The Coming Base." This paper referred to Rose Pearl, a pyroxoline base invented by Dr. McClelland, of Louisville, and that this had the qualities of color, of lightness, of strength, of adaptability, that Dr. Kingsley claims for celluloid. Why the profession had not taken hold of rose pearl better he did not know, but that he had, in common with several western dentists, used Rose Pearl for several years successfully. We need such a base as this, for its artistic capabilities alone should commend it to an artistic profession.

Dr. Crane (Paris) presented an upper and lower case of teeth on this base, celluloid, for the inspection of members.

REPORT OF THE PROCEEDINGS OF THE AMERICAN DENTAL ASSOCIATION.

Fifteenth Annual Session, held at Niagara Falls, Aug. 3d, 4th, 5th and 6th, 1875.

FOURTH DAY.—MORNING SESSION.

Dr. Rehwinkel read the report of the committee on mechanical dentistry.

This report regretted the apathy in reference to mechanical dentistry, and the proposition to separate it from the operative department. Societies do not foster it, and cheap bases have ruled out gold. It was to be regretted also that the best men are disgusted with the mechanical branch. It was likely that the question of formal separation will be proposed before long. A porcelain plate is considered by the committee as the highest art in this department; but it is and must be limited to a few experts. Continuous gum stands next, and is more practical; and that it is not more in demand is the fault of the dentist. We have influence enough to introduce it. Gold combined with rubber or celluloid stands next. Aluminum has not proved a success and cheoplasty has not obtained popularity, and does not seem likely to be *the* substitute for rubber, though successfully used; Watts' and Talbot's metals are most likely to be valuable; Celluloid was spoken of as having ceased to be an experiment, and promising to supersede all other cheap bases. Its advantages are beauty, lightness, and absence of injurious effects in the mouth, and the capacity for using plain teeth. A plate of this material had been worn by one of the committee more than three years and has stood well, though of the first put in the market, and made by a novice. The dry heat process was spoken of as rapidly gaining favor and possessing advantages, especially in repairing. The efforts to produce a vulcanizable gum from milk-weed were briefly referred to, the material being claimed as a successful substitute for rubber.

Dr. Stockton was pleased with the remarks made relative to continuous gum, to which he thought no work was comparable. The colleges turned out graduates entirely ignorant of it. Platinum and iridium in connection with celluloid makes excellent work, and these metals are stronger than gold. The dry heat process of working celluloid makes the best work, and does not require so close attention.

Dr. D. D. Smith: This subject is so kept in the background that there is little encouragement to speak upon it. Operative Dentistry only seemed worthy to be discussed, and yet there are failures in that department, and patients are continually losing their teeth, and being

thrown upon the resources of the mechanical department. The two branches cannot be separated, at least in our day. The speaker then presented a set of teeth from one of the best operators in the country, in the construction of which every principle of mechanical dentistry had been violated, and proceeded to point out the manner in which many principles are violated by those who attempt mechanical practice. He spoke of the preparation of the mouth, arrangement of the teeth, and the manner of articulating them. If only one tooth remains in the mouth with no antagonist, the first principle should be to extract it. The teeth should never be arranged in a horse-shoe shape, and the articulation should be such that the pressure would be equally distributed upon all the teeth. We have fallen down and worshiped at the shrine until progress has nearly vanished. Indolence and a love of gain join hands. A few discard it, but the saddest part of it is that only the exactions of the Rubber Co. seem to be taken into account in our discussions. If Rubber is King, then let us bow to law. If it is the material of all others, let us claim and use it; but if not, then let us abandon it for what is better. The Philadelphia Dental College teaches continuous gum and metal work more than any other; it ignores rubber as far as possible. We cannot, however, control entirely in the matter.

Dr. Abbott said the New York College did the same, and he presumed others also.

Dr. Atkinson said the record of the colleges astonished him; it showed more rubber work than any other.

Dr. D. D. Smith: Every candidate for graduation in the Philadelphia Dental College is required to show me a set of teeth in the mouth, on a metal base, and to present a similar set for the museum. Sets of continuous gum work are deposited in the museum every year.

Dr. McQuillen said our demonstrators are instructed to advise patients who come to the Dispensary for artificial teeth to have them on metal plates, but we cannot compel them to do so when they demand the rubber base, nor are students disposed to do more of metal work than they can help.

Dr. Barrett (of New York) made some remarks in reference to the new base made from milk-weed. He believed it stronger than rubber and that it would prove a perfect substitute. It seemed plain that some cheap base was required. Financial arrangements were only needed to place it upon the market.

The Committee on Appliances here made a report which was accepted.

This report found it impossible to more than mention the various

articles, owing to want of time. Of motive powers there were two, the Bastet Electric, and the Backus Water Motor. S. S. White exhibited an engine plugger, and Dr. Bonwill his electro-magnetic mallet. Brockway's smooth-pointed pluggers, and Gaylord's pneumatic, were both exhibited by Johnston Bros. Swartley's automatic mallet was shown by the inventor, and Corydon Palmer's set of instruments by S. S. White. Several kinds of engines were on exhibition; Bonwill's, the improved Elliott suspension with fusee attachment, the S. S. White, Edson and Evans' portable suspension, all being shown; also an extension treadle for engines by Johnston Bros.

S. S. White showed an improved bracket, and Johnston Bros. a bracket-table, designed by Dr. W. N. Morrison, which could be folded up like a fan, and when opened was a chest of narrow drawers. A locking arrangement for the castors of the Morrison chair was shown by Johnston Bros. The Harris chair exhibited by S. S. White had an improvement by which the upper section of the back could be removed, and the head-rest lowered; the arms also were detachable. Archer's improved chair had a compensating spring which is wound up as the chair descends, and assists to lift the chair by its accumulated force. Hayes' chair was the result of a great deal of inventive ability. Cogswell's dental cabinet, exhibited by Codman and Shurtleff, was mentioned as neat, compact, and perfectly adapted to the purpose. S. S. White's improved hand-piece, with hard-tempered steel bearings, is more durable than the former ones. Dr. Abbott presented an improved back-action for the engine. R. S. Williams exhibited a case and bottles for gold cylinders; also gold foil untrimmed. S. S. White exhibited a warm water heater and annealer combined, and a similar apparatus was shown by Johnston Bros. Codman & Shurtleff's ether and gas inhaler was highly spoken of. Johnston Bros. exhibited a gasometer for liquid or ordinary gas, which was a beautiful article. Butler's screw appliances; an improved air syringe with metal hand-shield; Hickman's double-lipped dam clamps were shown by S. S. White. Osborn's reflector, Jarvis' separators, the Bowman-Allen clamp-forceps and Bogue's tape forceps were handed in by Johnston Bros. Codman & Shurtleff exhibited a simple and cheap tape carrier, a file carrier, and a mouth mirror of improved construction, all favorably mentioned. Dr. Cushing's device for rotating disks at an angle was highly spoken of, and those of Drs. Hickman and Bonwill were also mentioned. Klump's porte polisher and Bonwill's chuck for holding points, Huey's improvement substituting a screw for the nut in mounting disks were mentioned; Bonwill's disks of hard and soft rubber and

corundum, and his diamond reamer, were thought to possess much merit. Butler's corundum points for polishing, and a bur cut like a bastard file were exhibited. Johnston Bros. showed a rubber pouch bib to protect the patient's clothing.

Ransom's vulcanizer was combined with a celluloid packer. S. B. Brown presented a dry heat celluloid apparatus, and Geo. E. Hayes one capable of being used in a vulcanizer. S. S. White showed a neat laboratory lathe ; O. C. White exhibited his improved chair, spittoon and bracket, which is simple, efficient and elegant.

Dental education was brought up by the reading of the report of the committee by Dr. Keely, the chairman ; he was followed by Prof. Flagg, who read a volunteer essay upon the same subject.

Dr. Keely's report spoke of the efforts now making for the elevation of the standard of the profession, which will determine the future of dentistry. It is not indispensable, though desirable, that the medical profession should recognize us. Dentistry demands a high tone of manhood, thorough discipline and careful training. Many lights of the profession have not enjoyed such education, but have achieved success in spite of this lack ; they would have the future members of the profession thoroughly prepared to practice. To assume to practice at this day without better preparation than those men enjoyed, would show a failure to comprehend or an indifference to the duties demanded. In dentistry, science must be both discovered and applied ; the ideal and the practical must be combined. A system of education which will harmonize the tendencies to over-estimate either scientific instruction or practical skill must be inaugurated. We are united as to the ends to be attained, but not as to the means. Shall the dead weight which embarrasses us be got rid of by penal enactments, or by the refusal of the profession to fellowship with any but reputable and worthy men ? What tests of knowledge shall we employ, and how shall the requisite medical and other knowledge be acquired ? Shall the specialty be taught by the medical colleges, or shall the dental college call in the medical professor to teach the needed medical knowledge ? The dental colleges will of course be continued, but the question is whether our efforts should be concentrated on a few, or frittered away on numerous starveling projects, that multiply half-taught aspirants for honors. Literary institutions, by want of resources and competition, render their honors worthless, and their example is before us. Professional occupations are crowded with incompetents. Only three first-class dental colleges are needed at present, and they could and should be endowed and furnished with able professors and ample apparatus. If we attempt to sustain a

large number, some will succumb to the financial pressure, and the others will not be as healthy or vigorous as they might have otherwise been.

Dr. Flagg's paper was published in full in the October number of the "*Dental Cosmos.*"

After the conclusion of the reading, Prof. Shepard said that the last speaker had made assumptions as to the workings of all the colleges which he questioned the correctness of. In Harvard there is no subordination of one department to another; all are on a par, and only in the estimation of the community do they vary. It was economy to pursue the plan of uniting different departments under one governing body. Dental colleges should be endowed, and if the State or a university would furnish apparatus, which the professors otherwise had to furnish themselves, the assistance should be welcomed, and we should not say that we are tacked on to the tail of the university. The title of D. D. S. is not to be found in the dictionaries.

Dr. McQuillen would approach the consideration of the subject in a dispassionate manner, independent of the interests of any institution and in favor of the broadest culture such as is the distinguishing characteristic of an educated gentleman in any walk of life. He believed in the law of evolution as applicable to the individual man, to society, professions, and institutions of learning. Fifty years ago there were only three hundred dentists in our country; many of these had failed in other occupations, and took up with this as an easy means of gaining a living. The artisan came from his trade, the blacksmith from his anvil, the carpenter from his jack-plane and saw, and with little or no preparation entered upon practice. A few only had studied medicine, and dissatisfied with the condition of the craft, conceived the idea of elevating the standard by establishing departments of dentistry in medical colleges. How were they received? So far from welcoming them, the faculties gave the cold shoulder to the proposition. There was only one course left, to establish institutions where dental students could receive culture, if only a partial one. When it is considered how much there is to know, it must be recognized that the most learned are only partially educated. The first dental college met with only a limited success. Its faculty, composed of medical graduates, sent representatives to the American Medical Association, and these delegates were treated as the applicants for dental departments had been. The cold shoulder was given them. The speaker then quoted from the printed transactions of the American Medical Association for 1852, in support

of his statements. Notwithstanding this experience, if a better course of instruction could now be secured by connection with Medical Schools, he would not stand in the way, but on the contrary, would favor such a movement. But the question is: Can that be done? In Dental Colleges instruction in theory and practice go hand in hand. The same facility is not found in Medical Schools; indeed, cannot be granted in the general practice of medicine and surgery, and it may be that the dental departments would prove equally defective in practical instruction. Medical students on graduating go out to learn the art of medicine, and woe to the community where the tyro has to practice. The graduate of the Dental College is to a certain degree prepared to enter upon practice.

Just criticisms of the defects of colleges cannot be objected to, for out of such criticism good will come; but the innuendoes and false statements that so often appear in regard to them are as unjust as they are ungenerous. Years ago Capt. Marryat, Mrs. Trollop, and a host of other writers of the same ilk, overran our country, and returning to their home in England, wrote works in which they misrepresented and ridiculed our country, its people, government and institutions, and predicted the speedy downfall of the young republic—not recognizing that in a young country the efforts of man must first be directed toward securing the necessities of life, the felling of trees, the erection of homes, cultivating the land, etc., and that it is not possible for the arts, sciences, and great institutions of learning to be developed at once. With none of that charity which is ever characteristic of a generous mind, or that broad generalization which belongs to a great one, they could only perceive and exaggerate defects, and could not recognize the possibilities of the great future which was in store for our country and its institutions. Is it surprising that this class of narrow minds should have had a representative in the dental profession who, visiting our country, making hasty and imperfect examinations of our Dental Colleges, and on returning to his country, in trying to write them down only exposed his own ignorance and prejudices? We can pity this manifestation of poor weak human nature, and regret that in place of trying to degrade and lower the institutions of another country, he did not aim rather to make for the institution with which he is connected a world-wide reputation, by proving himself to the profession as an able writer and an efficient teacher. But what shall be said of an American correspondent of a foreign Journal, who, not having the manhood to write over his own signature, Iago-like in assailing the fair fame and

impugning the motives of others, proves that the suspicious man may be ever justly suspected. When such men are dead and forgotten, the institutions which they reviled will be rendering valuable service to the profession, and to humanity. Communications such as the Chronicles of the Odontologues place the profession in America in anything but an enviable position, particularly when a British Journal apologizes for republishing such articles, and accounts for the appearance of them to the defective development of our people. If the Dental Colleges are not what they ought to be, sweep them out of existence. If they fail to properly prepare the student for practice, then close them up. The all-important question is not whether the dental student receives an education which will entitle him to recognition on the part of medical men ; but whether he is properly fitted to go forth and serve the community as a practitioner of dentistry. If the Dental Colleges do this, and he believed they do, they should be encouraged and supported.

Dr. Abbott wished to defend dental colleges ; he thought the independent schools, like the New York College, were as good as any, and that the faculty would compare with any.

Dr. Flagg feared that the feeling that had arisen would increase until the issue would split the profession.

The subject was passed, and Dr. I. Knapp read the report of the committee on Dental Literature, of which he was chairman.

Dr. Knapp's report was mainly devoted to a review of Salter's work on Dental Pathology, and a discussion of some of the views of the author. Somewhat copious quotations were made from the work to illustrate his style, which is simple, clear and vigorous. He deals sparingly in scientific terms, though evidently perfectly familiar with them. Judicial candor is observed in his statement of conclusions. The views of the author relative to the development of dentine are somewhat at variance to the generally accepted ones. He believes that a series of columnar cells is arranged upon the formative pulp, from the distal extremities of which are inwardly projected minute tubular threads, which are gradually prolonged in the same direction, and are separated by a homogeneous blastema ; and these are the only discovered elements in the formation of dentine. The supposed "fibrils of soft tissue" are simply the decalcified tubes themselves ; their indurated or viscid contents might easily be mistaken for fibrils. It is not probable that the nervous elements of the dentine pierce the walls of the tubes and occupy their axes.

The various theories of other authors upon this subject were then quoted and compared with those of Dr. Salter. An interesting case of paralysis of one side of the face, lip, and chin, the result of crushing the inferior dental nerve in extraction of the dens sapientiæ, was described, and the writer of the report stated that he had seen a similar result from the same cause.

Dr. Salter's work was commended as a valuable text-book for the student, and also a profitable one for the advanced practitioner.

The periodical literature of the profession was briefly touched on. The admission of crude and often irrelevant matter into the Journals was regretted, but it was considered unavoidable, as the editors were largely engaged in other duties, and receive only a limited compensation. They cannot therefore be expected to re-write communications or furnish original matter. There was, however, just reason to find fault, it was feared, with the imperfect performance of editorial work, the consequence of which is often an entire misapprehension of a writer's or speaker's opinions. The Journals were on the whole commended as having done a great and good work, second to no other agency. A quarterly Journal edited by a writer of varied and profound learning, aided by paid articles, would be a long step in the right direction, and would give permanency to valuable matter scattered through transient literature, and would afford the best minds of the profession a medium for their best thoughts.

This subject was not discussed. The next in order, pathology and surgery, was taken up.

Dr. Atkinson said that he had gone further into the change from physiological to pathological action than any other man. If the blood is equally distributed, nutrition takes place within the capillaries. When sufficient destruction of neurine occurs, congestion ensues, and circulation is arrested, and remanded back to cell-action, and the fluids become soft-solids. Another termination of the inflammatory process is tuberculous deposits. Disintegration continued, generates gases, and they are absorbed by the blood, and thus the blood corpuscles are converted into pus-corpuscles. After that comes corrosion, and icherous discharge, and sloughing. He would treat fever sores with a solution of forty grains of chloride of zinc to the ounce of water, and get union by first intention. We must know the tissues we are operating on; every man's work is either worship or blasphemy.

Dr. Taft said that where removal of calcareous deposits did not restore to health he thought rubbing the gums beneficial. It pressed

out the contents of the capillaries, and they took on a better circulation. He thought salicylic acid better than chloride of zinc; aromatic sulphuric acid is also beneficial, and so is depletion.

Subject passed.

The following list of standing committees for the year was read and adopted.

Physiology—J. H. McQuillen, S. W. Dennis, A. H. Brockway; Pathology—J. Foster Flagg, L. D. Shepard, I. Knapp; Chemistry—S. B. Palmer, J. S. Cassidy, L. G. Noel; Therapeutics—W. H. Atkinson, C. A. Brackett, C. R. Butler; Operative Dentistry—Frank Abbott, A. W. Harlan, H. M. Reid; Mechanical Dentistry—W. N. Morrison, D. D. Smith, W. C. Barrett; Dental Education—M. S. Dean, E. S. Gaylord, G. C. Daboll; Etiology—D. C. Hawkshurst, M. H. Webb, H. L. Sage; Prize Essays—F. H. Rehwinkel, G. W. Keely, H. J. McKellopps.

The committee of condolence in relation to the death of Dr. Hill reported as follows, which was adopted:

Whereas, This association has with sorrow learned of the death of our brother, Dr. Asa Hill, of Norwalk, Conn., therefore,

Resolved, That we signify in this public manner our sense of the great loss which the dental profession has sustained, and that we sincerely sympathize with his family in their bereavement.

Resolved, That these resolutions be inserted in our minutes, and that the Secretary is instructed to forward a copy of the same to the family of the deceased.

J. H. SMITH,
FRANK ABBOTT, } *Committee.*
A. W. HARLAN.

Adjourned.

AFTERNOON SESSION.

The subject of therapeutics was taken up.

Dr. Atkinson said that salicylic acid was non-corrosive. He used it dissolved to saturation in alcohol for wiping out cavities and treating abscesses. It does not destroy the epithelium like creasote; it is nearly inodorous, and also insipid. A solution of the alcoholic tincture in water is a good disinfectant for the spittoon, &c. In tooth powder it would prevent the formation of gases. The earnest seeker after truth was sometimes criticised, as he had been, for using different agents, as he had done. He had been the first to use creasote in teeth and did not go back on it now, though he had used thymol, &c. He had never seen any bad results from it in the hands of a level-headed man.

Often such results are from want of management. Salicylic acid is nearly the active principle of creasote.

Dr. Taft said he had used the new acid with great success for some time, and almost every day in some new way. He found it to allay chronic inflammation difficult to reduce. In one case of this kind which had been sore for eight years he had apparently cured in a day or so, by filling the canal half full with the crystallized acid, and covering with oxychloride. The tooth had remained well ever since. He preferred it dissolved in ether, which dissolves it easier than water or alcohol. He could deodorize bad-smelling roots with it, and do a great many things which creasote would not accomplish. Its great value lies in its antiseptic properties. He had used the "dental pain obtunder" with general good results, and can cut without pain by its use. Some do not find it so, however. The active principle of it he believed to be horse-radish. Carvacrol has not succeeded as well with him as with some others.

Dr. W. H. Allen had used the "pain obtunder" without any results. It made him sick, and he did not want it.

Dr. Stockton disliked the smell of it, and so did his patients, and he had found no benefit from it whatever. He had used salicylic acid with success. Dead teeth were apt to give trouble if cleansed too thoroughly at one sitting.

Dr. Osmond said that oil of peppermint was very useful for sensitive dentine; it was the best thing he knew of. A quack remedy called King of Pain had been recommended also.

Prof. Flagg said oil of peppermint would make his patients fairly howl. He had not found the pain obtunder very reliable; it did not seem to do much good, and occasionally is exceedingly painful. Sometimes a remedy will do a great deal for one person, and very little for another. He regarded Pond's Extract as very useful, especially in dead roots which were offensive. This is a quack remedy, but he is obliged to use all kinds, homeopathic and allopathic.

Dr. Shepard said that the state of the nervous system often made a great difference with the effect of pain obtunders. If you told a patient that you were going to use some great thing, and only used water, it would do a great deal of good. In Boston they are not troubled with sensitive dentine except in a few cases, mostly young persons; had found benefit from the "pain obtunder" in some instances. He thought locality made a great difference, and miasmatic influences rendered dental troubles more obstinate.

Dr. Abbott was not pleased with the "pain obtunder." In one mouth he thought it useful, but in the same mouth on the same day it did no good.

Dr. Morrison thought sharp instruments and a knowledge of how to use them, most successful with sensitive dentine. Nothing was superior to old-fashioned creasote.

Dr. Knapp, of Ft. Wayne, said the teeth in his region were nearly all sensitive, and that some agent that would control it would be a boon to miasmatic localities. He thought there was no more pain from the "pain obtunder" than from any other cold substance. Lime-water used for some weeks he had found beneficial; and he sometimes had to give blue-pill quinine, &c., before he could operate. There was danger of devitalizing the pulp, and pulps could not be treated in his region without doing so.

Dr. Butler thought electrical condition might have something to do with it; the condition of the operator might also. Thought the pain from the "pain obtunder" was simply due to coldness. It would do no good if wet.

Dr. C. S. Smith thought the "pain obtunder" had a constitutional effect from what he had seen of it; it seemed to have a stupefying influence, and very possibly was a powerful drug, and should be cautiously used. He heard that it was hasheesh.

Dr. Harlan said it was oil of mustard, camphor, aconite, and ether.

The subject was passed.

A discussion took place in reference to clinics at future meetings.

Dr. Abbott moved that there be no clinics, but on motion of Dr. Atkinson the motion was amended so as to substitute a vote of thanks to Drs. Bonwill, Webb, Gaylord and Klump, who had operated at clinics and added much to the interest of the meeting, and the substitute was carried.

The President elect, Dr. A. L. Northrop, was then installed, and acknowledged the honor done him in a few well chosen words.

A comprehensive vote of thanks was then adopted, including the retiring officers, members of the executive committee, and the hotels.

Dr. Keely made a verbal report from the committee on the Barnum testimonial fund, which he said they had hoped to close up at the present session, but had not succeeded in doing so, owing to the fact that there were several sums subscribed which had not been paid. They held Dr. Barnum's receipt for $1,070, and had about $100 on hand, and there were subscriptions which he thought would all be paid, amounting

to $150. He asked for another year to close the matter up, which was granted.

Drs. McQuillen, Buckingham and Pierce were appointed a special committee of arrangements for the next year.

The association then adjourned to meet in Philadelphia on the first Tuesday of August, 1876.

THIRTEENTH ANNUAL MEETING OF THE CONNECTICUT VALLEY DENTAL SOCIETY.

At Springfield, Mass., Oct. 21st and 22d, 1875.

MORNING SESSION.

Called to order at 11½ o'clock, A.M. President J. J. Anderson, of Springfield, Mass., in the chair.

The reading of the records of the last meeting, hearing reports, and the appointment of committees, etc., occupied the attention of the Convention for an hour, when it adjourned till 2 o'clock, P.M.

AFTERNOON SESSION.

Voted to proceed to the election of officers for the ensuing year.

In pursuance thereof the following officers were declared elected. President, H. F. Bishop, Worcester, Mass.; First Vice-President, H. W. Clapp, Westfield, Mass.; Second Vice-President, E. M. Goodrich, Westfield, Mass.; Secretary, C. T. Stockwell, Springfield, Mass.; Treasurer, N. Morgan, Springfield, Mass.

Executive Committee, L. C. Taylor, Hartford, Conn.; J. N. Davenport, Northampton, Mass.; Lester Noble, Springfield, Mass.

The retiring President's address then followed, and was an earnest plea for more culture on the part of the dentist, not of the mind and heart only, but of the body as well—a symmetrical development. Also for our Dental Societies, Journals and Colleges. He hoped the day would soon come when all would be compelled to graduate at some respectable dental college before entering on practice. Urged all to attend every meeting of our Society and take part in its proceedings; also to take at least three dental journals, for the reason that no one can afford to do without them.

After the induction of officers elect, the Convention proceeded to consider "*The Influence of Pressure in producing Decay of the Teeth.*"

Dr. Morgan thinks that pressure has nothing whatever to do with the decay of teeth.

Dr. Riggs has just returned from New York, where he had listened to a paper upon "The use of the Brush." The writer *was* physically blind, and, in his opinion, *mentally*, for he took the ground that the brush is of no use whatever.

He thinks that pressure has little, if anything, to do with the decay of teeth.

Dr. Morgan believes that in a well developed mouth a certain amount of pressure is natural ; but if an excess of pressure is produced by any unnatural cause, the membrane may become irritated sufficiently to produce an acid condition of the fluids.

Dr. Searle thinks that pressure may be so great as to prevent the full development of the enamel on approximal surfaces.

Dr. Riggs : We may learn by looking into the mouths of some of the lower animals. He has seen cases among the older animals worn out, even on the approximal surfaces, but has never seen one decayed. Must attribute the cause to one of two sources—the acid condition of the fluids produced by the contact and detention of food until it ferments, like yeast, or to fungi, which some contend will not act on the living subject. In his opinion the rust, or brown coating found on teeth, to a greater or less extent, is a fungus growth which derives its nourishment from the tooth. If it can grasp the enamel of a tooth and penetrate that, why not push its course into the dentine in all directions until it destroys the tooth ? One thing is sure, we have here a great field for the microscope. Have we enthusiasm enough to carry us beyond the dollars and cents ? He is fearful that we, as a profession, are getting into ruts. He hopes the day is not far distant when *research* is to be made more account of generally, and especially among our young men.

Mere mechanical pressure will not produce decay ; but if pressure exists to the extent of causing irregularity, which causes an irritated condition of the maxilla and gums, so that they will throw off a vitiated secretion, then pressure becomes injurious to the teeth, and perhaps may be the means of decay.

Passed to consider "*Causes of Failures in Dental Operations.*"

Dr. Searle : Probably the intention of the author of this question was "The Causes of Failures in Filling Teeth," and under this head would consider the subject.

Why is it that teeth decay ? and why is it when they are put in good condition by our hands, they continue to decay ?

We all know that the teeth have a *tendency* to decay and break down, even when the best operations are performed. In his opinion there is a deleterious chemical agent brought in contact in many. We often have cases of white decay which will dishearten the dentist; for, if these teeth are filled in the best possible manner, he will find, in a few years, that it will be "like a house built upon sands without foundation."

Dr. Noble: After writing my experience for a number of years, I have entirely changed my ideas regarding the causes of decay.

In my opinion it lies back many hundred years. Those races who live the most like the wild animals are the ones that possess the best sets of teeth. Every other part of the body is as much broken down as the teeth.

To sum the whole matter up in a few words, it is our civilization and mode of living.

Dr. Beales is not prepared to endorse all of Dr. Noble's theories, for statistics show that the average life of man is much larger now than a few hundred years since.

Dr. McManus thinks the discussion should now take a practical turn.

We do not always put in the right material. In some cases even amalgam will prove the best. Want of good judgment is one of the greatest causes of failures in our operations.

Dr. Beales: One great cause of so many failures is the use of adhesive gold and the mallet. Experience favors soft gold and hand pressure.

Dr. Clapp refilled with tin eight teeth with apparent success; at least they were worn fifteen years, while gold had failed in less than one year.

Adjourned till 7½ o'clock.

EVENING SESSION.

On motion of Dr. Taylor it was voted to lay the regular order of business on the table for the purpose of fixing the next place of meeting.

By invitation of Dr. McManus, and on motion of Dr. Searle, it was voted to hold the next semi-annual meeting of this Society at Hartford, Conn., subject to the call of the Executive Committee. Subject under consideration at adjournment resumed.

Dr. Taylor presented a report of tests with amalgams. Whole num-

ber of tests, twelve—four each of three different kinds—two washed and two unwashed. The unwashed plugs were all made as nearly as possible as directed by the party who made the special request for the experiments, while the washed plugs were made as we usually make them, washing them in alcohol and then squeezing out the excess of mercury therefrom. Of the twelve tests only two failed to show signs of leakage to a greater or less extent, which two were the unwashed of the Lawrence manufacture. These experiments proved very unsatisfactory to myself. I am convinced that if we were to experiment individually it would demonstrate that it is *not* so easy a matter to make amalgam fillings *perfect* as is generally supposed.

Also presented tests of oxychloride of zinc and "Fletcher's Artificial Dentine." They both swelled sufficiently in hardening to crack the glass test tubes they were made in ; but Fletcher's Dentine did not seem to shrink after becoming hard, while the oxychloride loosened in the tubes sufficiently to allow them to drop out. Fletcher's Artificial Dentine becomes the hardest of any pulp-capping I have ever used, and thus far has proved very satisfactory to myself.

Dr. Beales absorbs the excess of mercury in amalgam fillings by the use of tin foil.

Dr. Searle thoroughly absorbs the mercury before introducing, and then presses hard in packing. Believes in malleting amalgam.

Dr. Riggs thinks the excess of mercury, so often apparent, arises from the *extra warmth of the tooth* over the temperature of the amalgam when introduced into the cavity, and wishes to bring the amalgam to the same temperature of the tooth. Does not believe in malleting amalgam fillings.

Dr. Searle dissents, and accounts for the excess of mercury on the principle that the amalgam is not thoroughly condensed, and therefore, holds the mercury in its intervening spaces, like a sponge. The process of condensing, or packing into the cavity, causes it to rise to the surface.

Dr. Noble passes his amalgam through the flame of a spirit lamp before introducing, in order to avoid pain.

Dr. Anderson endeavors to keep his amalgam fillings at the same temperature of the general system by holding it in the palm of the hand while preparing for introduction. Also bathes the cavity with creasote.

Dr. Mills agrees with Dr. Searle in the theory of failures in dental operations being often the result of "constitutional changes" and the

presence of "deleterious chemical agents being brought into contact with the tooth," and would suggest as other causes, the want of absolute cleanliness on the part of the patient, and the lack of ability on the part of the operator in filling, the too general use of amalgam, and also a want of real heart devotion *to* and enthusiasm *in* our work, and personal investigation for ourselves and of our own work and methods, with the lack of thoroughness in the preparation of cavities. Advocated the practice of placing tin in the bottom of deep cavities to prevent unpleasant thermal influences.

Dr. Searle : I wish Dr. Anderson would give us the treatment and results of the case mentioned by him to this Society six or seven years ago.

Dr. Anderson : Nearly nine years ago a case was presented to me for treatment. The patient was a girl of about nine years of age. I found the gums spongy and inflamed, the secretions of the mouth decidedly acid, and the permanent teeth decayed, also defective places in the enamel, for instance, in the cutting edges of the superior lateral incisors, which were unusually thin, were small deep cavities, and the dentine exquisitely sensitive, as would naturally be expected. The superior centrals turned edgewise and prominent. Even the inferior central incisors had approximal cavities. Constitutionally, there was no pronounced disease, but a decidedly anæmic condition, blood low, and appetite poor and capricious.

I cleaned the teeth thoroughly, and removed all irritation possible from the gums, and prescribed a stimulating and astringent mouth wash to be used often and regularly. Prepared chalk was also placed around all the teeth every night before retiring, to remain until morning. I would here remark that it is very important in the treatment of all diseased conditions that regularity be observed if we would expect success.

Quevenne's iron pills 1 gr. three times daily, rare broiled beefsteak, oatmeal, and Graham bread, in short, good, wholesome, plain food, avoiding sweets and grease as much as possible, out-of-door exercise every day, light studies, and to retire early, flannel under-clothing to be worn summer and winter. Attention was paid to the general health in several directions.

It is very easy for us to give directions to our patients, but very difficult to get them to carry them out. I had peculiar opportunity to control this patient, or all my efforts would probably have been in vain. Yet, at times, if she could not make her meal of pie and cake, or bread

with plenty of syrup, she would prefer to forego eating. The chalk was peculiarly offensive, and she would not use it willingly. The teeth were externally sensitive, and she would object to have them touched. And yet, by kindness and firmness on the part of the family, the brush, mouth wash, and chalk, were used regularly. After a time, the appetite for proper food improved, yet a share of sweets were conceded.

Through great trials and tribulations, and short appointments, I succeeded in filling those teeth temporarily with oxychloride of zinc, and have since removed nearly all and filled with gold. Nearly every tooth has one or more small fillings, although many incipient cavities were removed, and the surfaces polished. The oxychloride of zinc appeared to be wonderfully adapted to her case, for they all endured remarkably well, and one of them in an inferior central incisor is in good condition to-day, although put in nearly nine years ago. The prepared chalk was used three years, the iron pills for a much longer time, at intervals. The six year molars were extracted at the proper time.

The general health is now perfect. The teeth are white and handsome, and show no fillings, unless a dentist should look for them. The gums are pale and hard, and the secretions of the mouth normal, slightly alkaline, and no decay of the teeth is now taking place. The front teeth are not now too full, the lips covering the teeth easily, which makes a great change in the expression of the mouth. The change in the fullness of the front teeth is owing, in my opinion, to the extraction of the six year molars, although it is a change that cannot often be looked for from such a cause. The change in the secretions of the mouth and in the dentine is owing to constitutional treatment. The chalk served to neutralize the action of the acid during the night, at which time decay progresses much more rapidly. During the day we are eating, drinking, etc., and the contents of the oral cavity are constantly changing, and the acid is not so strong. If some of the chalk should be swallowed, it would do no harm, but be a benefit.

I have had perfect control of this case, and saw it nearly every day, and the treatment was carried out unceasingly as long as necessary, and we have been rewarded with gratifying success.

I claim nothing new or original in the treatment of this case, but wish to call attention to what may be accomplished by the persistent and systematic carrying out of it to its culmination.

Voted to invite Dr. Mills to give a clinic before the Convention to-morrow morning.

Adjourned until to-morrow morning at 10 o'clock.

MORNING SESSION.—SECOND DAY.

Voted to pass the subject under discussion and take up "Miscellaneous Subjects."

On motion of Dr. Searle it was unanimously voted as the sense of this Convention, that the attention of instrument manufacturers should be called to the usual imperfect serrations of the grasping beaks of forceps—leaving the elevated edge, which often bears upon the tooth to be extracted, entirely smooth. The *entire* grasping surface should be well serrated.

It was the universal expression on the part of members that we, in fact, have no forceps properly made.

The question being asked as to what shall be used as a covering or protection for oxychloride of zinc while hardening, Dr. Bartholomew suggested sanderac varnish. Dr. Anderson, beeswax. Dr. Murlless, gum shellac dissolved in alcohol. Dr. Brackett, gutta percha and chloroform. Dr. Morgan, beeswax, then burnish with a hot burnisher. Dr. C. S. Hurlbut approves Dr. Morgan's method. Dr. Vincent wants to keep it perfectly dry for thirty minutes.

Dr. Riggs alluded to Dr. Elliott's theory of the action of creasote upon the pulp, as stated at the recent meeting of "The New York Academy of Dental Surgery," and remarked that he was favorably impressed by his theories.

Dr. Stockwell has used with very gratifying success, for nearly two years, the oxide of zinc saturated with pure creasote, as a direct application to exposed pulps, gently pressing it to its place in the cavity with a small piece of spunk, after which he applies the oxychloride in the usual way, and finishes with metal.

His attention was called to this method by reading a paper written by Dr. J. S. King, of Tennessee, wherein he strongly advocated this treatment.

Dr. Bartholomew being requested to report the result of a case of necrosis presented by him at the last annual meeting, gave a statement as follows:

The case I brought to your notice last October, as you will recollect, was a case of necrosis involving the alveolus of the four front incisors, cuspid, and first bicuspid right side, extending one inch back on the palatine plate of the superior maxillary bone.

The diseased portion was removed by Dr. Breck, of Springfield, who sent the patient to me for what further treatment might seem necessary.

When the case came into my hands, the opening under the lip into

the nasal cavity was sufficiently large to admit the passage of my finger, necrosis still at work in the hole surrounding the first bicuspid. The pulps of both bicuspids being exposed from caries, I removed them, as also the remaining diseased part.

Dr. Breck had ordered the gargling of salt and water through the opening, which I have continued to the present, for its cleansing effect and to counteract the tendency to catarrhal inflammation. My plan was, if possible, to induce a growth of flesh sufficient to fill the space previously occupied by the bone removed.

I commenced the treatment by once in four days scarifying the surface over which it was desirous to produce a new growth of flesh. I was soon gratified by seeing new granulations at different points. After a little granulations ceased, but commenced again upon alternating the *knife* with *iodine* and chloride of zinc.

The opening along the margin of the gum commenced to heal slowly from the bottom, at which point the irritation was applied. The folds of the gum had dropped together upon the removal of the bone, but showed no inclination to heal along the margin of the wound. The transverse cut from the outer gum to the lip had settled and contracted, leaving the large opening into the nasal cavity — healing from the bottom of the opening on the line of the gum, progressed both ways, making new flesh in the cavity above, and slowly closing towards the surface the lips of the gum.

After some four months the large opening under the lip commenced to granulate quite rapidly at the surface, and so much farther than the cavity above that I feared a closing of the opening before the cavity above should be filled, leaving a sock in which the secretions from the nasal cavity might do mischief. Granulation at this point was arrested for a time.

In April the healing had so far advanced that I felt it was safe to supply an artificial denture, which I did of celluloid, letting the plate extend up sufficiently to cover the opening that remained under the lip. After inserting the plate I commenced operating again upon the external opening. It was soon apparent that the outer opening would not entirely close unless granulation could be induced at the margin of the lip, downward, so as to close in from all points to the centre. By letting all the other parts rest for a time and keeping a slight irritation along the margin of the lip, granulation was induced at this point, and now the healing is so far advanced that I think there is no doubt of ultimate success. The opening at the present time into the nasal cavity is about the size of a common excavation. The opening along

the margin of the gum has permanently closed from either extreme, a third of the distance, and the remainder within a sixteenth of an inch of the surface. As the case now looks I expect to report at the next meeting a complete success.

Adjourned till 2 o'clock, P. M.

SECOND DAY—AFTERNOON SESSION.

Proceeded to consider "Celluloid *vs.* Rubber."

Dr. Bartholomew has used celluloid constantly for two and one-half years. The first year was disgusted with it, but for the last eighteen months has used it with general satisfaction. It seems to absorb and become discolored in some cases, which he thinks is caused by the camphor in its composition. Does not put on the pressure until it has been over the flame at least fifteen or twenty minutes, and then brings it rapidly down. It does not warp. Believes that it is working more satisfactorily than did rubber after it had been used only the same length of time, and would now use it in preference to rubber nine cases out of ten. Advises his patients not to use soap in cleaning the plate, as he believes the alkali in the soap is deleterious, and has a tendency to discolor.

Dr. J. S. Hurlbut has more confidence in rubber, and believes celluloid would not be used were it not "*fighting Josiah.*"

Dr. Morgan advocates the use of sand mixed with the plaster—one-fourth part of sand to three-fourths of plaster, in enveloping casts, especially when he wants to work it at once. Believes the pressure should be strong and heavy in order that the plate may be more dense and firm. By the use of sand mixed with the plaster the casts may be used in fifteen or twenty minutes. Uses glycerine.

Adjourned, to meet at 2 o'clock, P. M.

AFTERNOON SESSION.

Dr. Miller would like celluloid very much if it would maintain its color so that he could use plain teeth, as it makes a very beautiful gum.

Dr. Noble believes that all the apparatuses for its manipulation are, as yet, *very* imperfect.

Dr. Pelton prefers celluloid to rubber nine times out of ten. Has made over two hundred plates the past eighteen months, and finds it fully up to his expectations. Among its desirable qualities are its ease of manipulation—less time in working than rubber. It is stronger, better looking, and I think, purer, and more healthy in the mouth than rubber. In my experience have had less failures than I anticipated. Cannot say what the result of longer wear upon the plates will be.

The plates cost more than rubber, but if it proves to be better, that should not be considered. Uses the steam apparatus.

Dr. Bishop prefers celluloid. Thinks it is stronger, cleaner, and better looking. Never wants to go back to rubber, either for full or partial sets. Puts it up in oil.

Adjourned. C. T. STOCKWELL, *Secretary.*

NOTES.

In Memory of Dr. A. W. Morrison.

At a special meeting of the St. Louis Dental Society held on Wednesday evening, July 16th, the following resolutions of respect to the memory of Dr. A. W. Morrison were unanimously adopted.

Whereas, Dr. A. W. Morrison, an active and respected member of this Society, has been removed from our midst by death, therefore,

Resolved, That in the death of Dr. A. W. Morrison, the profession has lost an ardent, sincere, and valuable member, and one whose many excellencies of character have endeared him to all with whom he became associated.

Resolved, That the members of the Society deeply sympathize with the relatives and friends of our departed brother in this their sudden bereavement.

Resolved, That a copy of these resolutions be presented to the family of the deceased, and that they be published in the Dental Journals.

Disinfectants and Disinfection.

An interesting paper by E. Waller, Ph. D., in the *American Chemist* for July, sums up admirably what is at present definitely known on this important subject. The following are the conclusions drawn by the writer :

1. For prompt disinfection which is to be only temporary, strong oxydizing agents, as chlorine, permanganate of potassium, nitric acid, etc., should be used. Of these the cheapest and most available is the chloride of lime.

2. Carbolic acid may be diluted to a point at which it ceases to act as a disinfectant, though it may still act as an antiseptic. To disinfect, the carbolic acid should probably constitute about one per cent. of the mixture.

3. The action of metallic solutions in disinfecting is comparatively slow. Ferric nitrate especially, and iron and zinc salts generally, are the best of this class of disinfectants.

4. A mixture of iron and zinc salts seems to be superior to either used alone

5. The preparations known as carbolates of lime usually contain but little carbolic acid, and are of comparatively little efficacy. The lime absorbs carbonic acid from the air, and the efficiency of these preparations as disinfectants is apparently diminished in proportion as the lime assumes the form of carbonate.

6. The powders (carbolated) containing no lime have still less effect on putrid matter than those in which lime is an essential constituent.

Why a Noted Race Horse Died.

The examination of the body of Lexington, the great Kentucky race horse, revealed that the part of the skull under the left eye, where the trouble seemed to be, was filled at least with a quart of masticated food, that had been forced into the cavity through an opening in the upper jaw, made by the loss of a tooth.—*Cincinnati Enquirer.*

A New Illustration of the Danger of Etherization.

A tooth ulcerated in the left upper jaw of Mr. John H. Hallock, of Plainfield, New Jersey, six months ago. To the ulceration he gave little attention ; but when, six weeks ago, acute pain in the jaw began to annoy him, he consulted a local dentist. The latter said that Mr. Hallock's jaw was diseased, and a student in the Homœopathic Medical College at Third avenue and Twenty-third street, invited Mr. Hallock to the college. Dr. William Tod Helmuth, the Professor of Surgery, found Mr. Hallock suffering with necrosis of the left superior maxillary, or rottenness of the left upper jaw, and decided that it must be removed.

Mr. Hallock and his wife appeared in the Homœopathic Hospital on Saturday, the former to be operated upon by Prof. Helmuth. A pad impregnated with ether was applied to Mr. Hallock's nostrils, and after a few inhalations he was unconscious. Then he was placed on the operating table, the amphitheatre being occupied by attentive students.

Prof. Helmuth had slit Mr. Hallock's lip left of the median line, drawn several intervening teeth, and begun to extract the decayed jaw, when he observed that Mr. Hallock was dying.

The Professor threw aside the knife that he had been using, and, aided by his assistants, Drs. Hill and Thompson, endeavored to save Mr. Hallock's life. But Mr. Hallock died.

Prof. Helmuth said yesterday : "A student introduced Mr. Hallock to me on Saturday, Nov. 13. I perceived that a part or the whole of his left upper jaw was decayed, and should be removed. On the following Tuesday, by appointment, he came to my office. He was extremely nervous, and his heart beat feebly, though normally. His health, he said, had always been good. I told him that I would operate on the Saturday succeeding — yesterday — at the Homœopathic Hospital. He came to the hospital, was subjected to the influence of ether, not more than two ounces and a quarter being used, and put upon the operating table. Two physicians assisted me, one marking Mr. Hallock's pulsations and the other administering the ether. I had parted Mr. Hallock's left upper lip, and taken out several teeth, which almost fell out at my touch, when I saw that his face was purple, the most prominent indication of asphyxia. We tried artificial respiration, friction, inversion, and the galvanic battery, but in vain. Two ounces and a quarter of ether is a very small quantity to administer. I have often given a patient in the course of an operation a pound. A man or woman addicted to the free use of alcoholic liquors incurs a far greater risk in taking an anæsthetic, than one who is not. Alcohol, in fact, is given to one who is to be influenced by an anæsthetic, that the influence may be easily established. A person who is easily influenced by an anæsthetic is more liable to death than one who is not."

Professor Helmuth's version of the case was supported by the testimony of Drs. Hill and Thompson at the post-mortem. Dr. Finnell, one of Coroner Woltman's physicians, informed the jury that Mr. Hallock's death was due to the action of ether on an unusually small and unnaturally fat heart. The verdict was in accordance with Dr. Finnell's information.

Necrosis may proceed from a decayed tooth, a particle of a tooth that has been left in the jaw by an unskillful dentist, or a serious injury to the jaw. Ulceration is its first form, and this, if uninterfered with, ordinarily develops into the rarely cured necrosis, which destroys its victim in a few weeks. The removal of the dead bone is a new operation, and has been essayed only seldom in New York.

GOODYEAR DENTAL VULCANITE CO. *vs.* DR. EBEN M. FLAGG.

Just as we are ready to issue the present number of the MISCELLANY, we learn of a decision of the U S. Circuit Court, of so much interest to the profession that we delay the presses in order to insert it.

The Vulcanite Company recently commenced a suit against Dr. Eben M. Flagg, of this city, to compel him to take a license from them, or desist from the use of celluloid.

They asked the Court to grant an interlocutory or temporary injunction, restraining Dr. Flagg from the use of celluloid, pending the final decision of the case. This Judge Blatchford refuses to do, in the following decision.—Ed.

U. S. Circuit Court.

THE GOODYEAR DENTAL VULCANITE COMPANY AND OTHERS,
vs.
EBEN M. FLAGG.

BLATCHFORD, J.

I do not find that any decision has been made in regard to the Plaintiffs' patent which gives to it such a construction as necessarily includes the process and substance used by the Defendant. In the Gardiner case the Defendant did not compound india-rubber with sulphur, but he compounded india-rubber with iodine, and he employed heat to harden the rubber (Goodyear Dental Vulcanite Co., *vs.* Gardiner, 4 Fisher's Patent, Cases 224–231). In the Smith case the view of the Court was that the material to be used under the Plaintiffs' patent in carrying out the invention patented was to be india-rubber "and the compounds commonly employed therewith, reduced to a soft plastic

condition, capable of vulcanization, and subsequently vulcanized." (Goodyear Dental Vulcanite Co., *vs.* Smith, 5 Official Gazette of Patent Office, 585.)

It appears from the description of the process used by the Defendant in this suit, that he does not use india-rubber or any substance capable of vulcanization ; that the substance he uses is one which is rendered plastic by heat and is not hardened by heat, that heat is used in the process to soften the substance and render it plastic, and not to harden it, and that the substance, after being moulded, is hardened by being cooled. It is not sufficiently clear that this process is embraced in the claim of the Plaintiffs' patent to warrant the granting of an injunction, until one is awarded as the result of a decree for the Plaintiff on final hearing.

E. N. DICKENSON and B. F. LEE,
For the Plaintiffs.

W. D. SHIPMAN, C. A. SEWARD, and E. L. HAMILTON,
For the Defendant.

Decision Dec. 7th, 1875.